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AN EVALUATION OF THE CLASSICAL CANDLE-MOUSE EXPERIMENT, *Leonard A. Cohen* 127

NEO-THOMSONIANISM IN THE UNITED STATES, *Alex Berman* 133

THE BOSTON EDITIONS OF NICHOLAS CULPEPER, *David L. Cowen* 156

ARABIC MEDICINE IN ENGLAND, *D. M. Dunlop* 166

THE INVENTION OF EYEGLASSES, Part II, *Edward Rosen* . . 183

NOTES AND QUERIES 219

Retrospect and Prospect; *E. Weil:* The Skull of Descartes; *Bert G. Anderson:* Teeth of Colonial Americans; Petruccius on the Adrenals; Diseases of Books; The Pharmacy of S. Giovanni Evangelista; Robert Boyle and Samuel Collins on Russia; Versified History; Science in the Renaissance: A Survey; THE DE ALCHIMIA of Albertus Magnus; History of Children's Hospitals; Origins of Electroshock Therapy; Logan Clendening Lectures; D. J. Davis Lectures; Creation of First Chair and Department of the History of Medicine in India

BOOK REVIEWS 232

Munk's Roll, Vol. IV. *Lives of the Fellows of the Royal College of Physicians of London 1826-1925.* Reviewed by the Editor . . . 232

Scritti inediti di Girolamo Fracastoro. With introduction, comments, and notes by Francesco Pellegrini. Reviewed by Dorothy M. Schullian 233

Luigi Galvani. *Commentary on the Effect of Electricity on Muscular Motion.* Robert Montraville Green, Trans. Reviewed by Frederick G. Kilgour 235

J. C. T. Oates, Comp. *A Catalogue of the Fifteenth-Century Printed Books in the University Library, Cambridge.* Reviewed by the Editor 235

Ernest Jones. *The Life and Work of Sigmund Freud.* Vol. 2, *Years of Maturity 1901-1919.* Reviewed by Winfred Overholser . . . 236

Francelia Butler. *Cancer through the Ages. The Evolution of Hope.* Reviewed by the Editor 237

José Joaquin Izquierdo. *Montaña y los Origenes del Movimiento Social y Cientifico de México.* Reviewed by Francisco Alonso de Florida 237

Douglas Guthrie. *Nursing through the Ages.* Reviewed by Elizabeth S. Bixler 238

Douglas Guthrie. *From Witchcraft to Antisepsis: A Study in Antithesis.* Reviewed by George Blumer 239

Mirko Drazen Grmek. *Hrvatska Medicinska Bibliografija.* (Croatian Medical Bibliography. Description of printed books and articles from the area of human and veterinary medicine and pharmacy which bear upon Croatia.) Reviewed by Ljubodrag T. Mihailovic 240

Macdonald Critchley, with the collaboration of William H. McMenemey, Francis M. R. Walshe, and J. Godwin Greenfield. *James Parkinson (1755-1824). A Bicentenary Volume of Papers dealing with Parkinson's Disease, Incorporating the Original 'Essay on the Shaking Palsy.'* Reviewed by the Editor 242

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An Evaluation of the Classical Candle-Mouse Experiment

LEONARD A. COHEN*

IN the development of present-day knowledge in the field of respiration, the candle-mouse experiment attributed to Robert Boyle has assumed the status of a rather classic experiment and is often mentioned[4,5,6] in the literature.

It appears that Robert Boyle sealed a mouse and a lighted candle in a jar and then proceeded to evacuate the air from the jar with his ingenious "pneumatical engine." The candle went out and the mouse died practically at the same instant, thus apparently demonstrating, long before Lavoisier discovered oxygen, that combustion and respiration both rely for their existence upon the same element in air and are, therefore, similar processes. The striking simplicity of this experiment and the obvious significance of its results would seem to recommend it immediately as one of those rare strokes of genius which deserves a hallowed place in the history of science.

The original description of the candle-mouse phenomenon by Robert Boyle is quoted below.[2]

> Wherefore I have been sometimes inclin'd to favourable thoughts of their opinion, who would have the Aire necessary to ventilate, and cherish the vitall flame, which they do suppose to be continually burning in the heart. For we see, that in our Engine the flame of a Lamp will last almost as little after the Exsuction of the Air, as the life of an Animal: Nay I remember, that though I devis'd a more promising way, to make a fire last in our exhausted Receiver, yet it would not succeed. . . . (pp. 365-366)

This is a clear statement of the case and justifies the credit given to Boyle by various authors[4,5,6] for this basic observation. It is important to note, however, that Boyle did not describe any specific experiments but was apparently summarizing his combustion-respiration observations.

Earlier in the same book[2] Boyle described specific experiments, the most pertinent of which are quoted below.

> We took a Tallow Candle of such a size that eight of them make about a pound, and having in a very commodius Candlestick let it down into the Receiver, and so suspended it that the flame burnt almost in the middle of

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the Vessel, we did in some two minutes exactly close it up: and, upon Pumping very nimbly, we found that within little more then half a minute after the Flame went out, though the Snuff had been purposely left of that length we judged the most convenient for the lasting of the Flame.

But the second time having put in the same Candle into the Receiver, (after it had by the blasts of a pair of Bellows been freed from Fumes) the Flame lasted about two minutes from the time the Pumper began to draw out the Air. . . . (p. 74)

. . . we took slender Tapers of white wax, (commonly called Virgins Wax) that being found to burn with much less smoke than common yellow Wax: . . . But we found upon two several tryals, that from the beginning of pumping, the Flame went out in about a minute of an hour.

And lastly, closing up the same Taper, lighted again, to discover how long it would last without drawing out of the Air, we found that it . . . lasted about five minutes, . . . (pp. 76-78)

(Mouse) . . . those Convulsions (that, if they had not been suddenly remedied, had immediately dispatch'd him) seis'd on him six minutes after the Pump began to be set awork (p. 331).

There is no record in Boyle's book[2] of any experiment in which a burning candle and a mouse were enclosed together in a chamber which was then evacuated. The above experiments in which burning candles and a mouse were separately evacuated can be summarized as follows. The flame was extinguished in one-half to two minutes, depending on the type of wax, while the mouse survived six minutes. Furthermore, even a candle placed in an unevacuated chamber did not burn as long as the mouse lived in the evacuated chamber. The data indicated that the mouse could last more than twice as long as the flame. Yet Boyle made the surprising conclusion that "in our Engine the flame of a lamp will last almost as little after the Exsuction of the Air, as the life of an Animal."

Thomas Hooke, the designer of Boyle's "pneumatical engine," probably noted this discrepancy and he suggested before the Royal Society of London a few years later that the problem could be solved by a special experiment.

On this date Hooke made a suggestion for an important experiment, the result of which was later on to cause much difficulty for many years namely, the enclosing 'of an animal and a candle together in a vessel, to see whether they would die at the same time or not.' A week later, on 28 January 1662/3 the experiment was made with a burning lamp and a chick: 'and the lamp went out within two minutes, the chick remaining alive, and lively enough.'[1] Thus the first significant experiment bearing at once on the related problems of combustion and respiration had produced a result that suggested difference rather than similarity in these processes.[5]

The first recorded combination combustion-respiration experiment, then, was actually a chick-lamp experiment, rather than a

mouse-candle, and the results agreed with Boyle's separate experiments on candles and mice but disagreed with his conclusions from these experiments.

Some nine years later Robert Boyle published an account of what must be considered to be his first combination combustion-respiration experiment.[3] The animal he employed was a greenfinch.

> After he had for a pretty while, by being kept in the free Air, recovered and refreshed himself, the former tryal was repeated again, and at the end the second minute the flame of the Lamp went out; but the bird seemed not to be endanger'd by being kept there a while longer.
>
> After this, we put in together two lighted Lamps at once, (viz. the former and another like it) whose flames, according to expectation, lasted not one whole minute before they went out together. But the Bird appear'd not to have been harmed, after having been kept five or six times as long before we took off the Receiver. (pp. 110-112)

These data confirm Hooke's chick-lamp experiment, yet one cannot help but wonder at the apparent lack of patience in both of these investigators, since neither of them waited to see just how long their animals would live after the lamp was extinguished. This would seem to yield critical data which could be obtained, after all, by merely letting the experiments continue.

A little later in the same book, however, Robert Boyle did come very close to a correct conception of the similarities and differences between the combustion-respiration phenomena he had been studying.[3] Although he was undecided between at least two concepts, the fact that one of them was essentially correct gives him great stature among the seventeenth century scientists.

> Whether this survival of Animals, not only to a flame that emits store of fuliginous steams, as in this tryal; but to that which is made of so pure a fuel as Spirit of Wine, that affords not such steams (as in the former experiment;) *Whether,* I say, this survival proceed from this, That the Common flame and the Vital flame are maintained by distinct substances or parts of the Air; *or* that common Flame making a great waste of the Aereal substance, they both need to keep them alive, cannot so easily as the other find matter to prey upon, and so expires, whilst there yet remains enough to keep alive the more temperate Vital flame; *or* that both these causes, and perhaps some other, concurr to the *Phoenomenon,* I leave to be consider'd. (pp. 117-118)

This completes the seventeenth century literature pertaining to combustion-respiration studies. It is clear that some answers had been obtained, but the final problem of whether combustion and

respiration both require the same substance for their existence was certainly not conclusively proven or disproven.

With the benefit of modern knowledge, the present-day scientist may well wonder why the combustion "mouse-candle" type of experiment was not definitive. Was the experiment wrong, were the deductions wrong, or was the experiment just incapable of yielding a conclusive result? In the attempt to answer these questions the experiment was repeated and some related experiments which made use of modern methods were also done in an effort to get a

TABLE I

	O_2 (%)	CO_2 (%)
Candle extinguished at	14.8	4.1
Mouse died at	3.5	11.5

TABLE II

Mouse number	1	2	3	4	5
Candle out (seconds)	29	34	38	43	51
Animal "dead" (seconds)	29	42	52	59	262
Difference (seconds) between time for candle to be extinguished and time for mouse to die	0	8	14	16	211

Data are arranged in the order of progressively decreasing rates of evacuation. The evacuation rate can be estimated in each case from the time required to extinguish the candle.

The total pressure at time of death for each of the 5 mice varied between 40-90 mm Hg.

clear understanding of what is involved in the classic candle-mouse experiment.

A small lighted candle was introduced into a liter beaker which was inverted over water. At the same time a mouse was also placed under the beaker. In this experiment the air was not evacuated. The flame was extinguished on the average in 19.0 seconds, while the average life span of the mouse was approximately two hours. The mouse obviously can exist much longer than the flame.

The candle was placed in the beaker by itself and a sample of air was withdrawn and analyzed after the flame went out. Also, a lighted candle and a mouse were placed under the beaker and after the mouse died, an air sample was withdrawn for analysis. The data

appear in Table I. These data show that the lowest O_2 tension at which the candle would burn was still more than four times as high as the lowest O_2 tension at which the mouse could survive. The CO_2 tensions varied, as might be expected, in opposite directions.

The above experiments show a tremendous difference between the performances of the candle and the mouse. Certainly Robert Boyle could not have missed such great differences when he stated in 1660, ". . . the flame of a lamp will last almost as little after the exsuction of the Air, as the life of an Animal. . . ." Boyle's observations were almost always made while the air was being evacuated, however, so similar experiments were performed in this laboratory using an electric vacuum pump.

The lighted candle and mouse were placed in a 13-liter bell jar and evacuation was commenced immediately. The results appear in Table II. As evacuation proceeded, the mouse first became convulsed, then became prostrate while still convulsing and, finally, ceased to move. The animal was arbitrarily assumed to be dead when it stopped all movements. These data show that the slower the rate of evacuation, the greater the difference between survival times of the flame and the mouse. Apparently, Boyle's "pneumatical engine" could evacuate the air at a fairly fast rate so that the survival times of his candles and animals, whether evacuated separately or together, were quite close. Actually, however, evacuation complicates the experiment since it introduces a new variable—decreased atmospheric pressure—which tends to minimize differences and thus mislead the investigator.

It is clear from experiments performed in this laboratory that the mouse can actually live much longer in a closed container because it can survive on a much lower O_2 tension. In retrospect, the candle-mouse experiment was incapable of yielding a conclusive result. The candle is extinguished at the same time that the mouse dies only under the very specialized condition of fairly rapid evacuation. If the experiment is better controlled, however, the mouse will always live long after the flame has gone out. If Boyle had known this, he might well have concluded that combustion and respiration were different processes and subsisted on different substances since one could endure in a closed container long after the other could no longer survive. The deduction that combustion and respiration are similar processes which use the same element is of course correct, but the candle-mouse experiment certainly

does not prove this, but, by itself, would actually tend to disprove this truth.

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Neo-Thomsonianism in the United States*

ALEX BERMAN†

". . . Though somewhat partial to the name Thomsonian, as we look on the discoveries which Samuel Thomson made in medicine to be superior to any and all of the theories of past ages; yet, by assuming his name we make ourselves liable to be accused of advocating his errors (for no one is perfect); and his opposition to education &c., makes this epithet really objectionable . . . It restricts those who assume it, to his notions and views, and rather forbids improvement in our noble science."

The New England Botanic Medical and Surgical Journal, Worcester, Mass., 1848, 2, 13.

I.

STATED in broad terms, Neo-Thomsonianism represented the transformation of a movement which had for its base a mass of uneducated, fanatical patent right-holders[1] into a Botanic cult seeking survival in scientific respectability. This change was very marked by mid-century, and did not escape the attention of the discerning Worthington Hooker, who acutely appreciated the irony of the situation. Here was a group of Botanic practitioners, sheepishly dropping the name "Thomsonian," forming medical schools, state medical societies, boards of censors, and issuing diplomas in imitation of the regulars. Indeed, "they had thus the effrontery," wrote Hooker indignantly, "to ask that they might possess, in common with us, that which they have always branded an unjust and odious monopoly. This is a *morceau* in the history of Thomsonism, too precious to be lost."[2] Besides appropriating some of the organizational and educational trappings of the regulars, Hooker also noted that the Neo-Thomsonians were expanding their materia medica, were using steam and emetics less frequently and with more caution, and were beginning to vaccinate for small-

* The activities of American Botanic practitioners were investigated by this writer in a doctoral dissertation entitled *The impact of the nineteenth century botanico-medical movement on American pharmacy and medicine*, University of Wisconsin, 1954. Portions of the sixth chapter of this dissertation form the basis of the present article. This study was supported in part by the Research Committee of the Graduate School from funds supplied by the Wisconsin Alumni Research Foundation. The writer is indebted to Dr. George Urdang, Professor Emeritus of History of Pharmacy, for his comments and suggestions.

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1 For a discussion of the old Thomsonian movement, see Berman, Alex. The Thomsonian movement and its relation to American pharmacy and medicine. *Bull. Hist. Med.*, 1951, 25, 405-428; 519-538.

2 Hooker, Worthington. *Dissertation on the respect due to the medical profession, and the reasons why it is not awarded by the community*. Norwich, J. G. Cooley, 1844, p. 15.

pox and employ cathartics, in contrast to the practice of the old Thomsonians.[3]

Not only did the old Thomsonian materia medica and therapeutics begin to undergo transformations during the founder's lifetime, but serious organizational changes had also occurred. Towards the end of his life, the vision that Thomson had so hopefully nurtured over the years, of a gigantic "Friendly Botanic Society" composed of citizens happily treating each other with Thomson's patented system and avidly reading his *New Guide,* was fast fading away. The first serious blow to this dream had been Howard's abortive defection in 1832 and the formation of the dissident "Improved Botanics."[4] Thomson had, however, surmounted this obstacle, only to be confronted six years later with a disastrous split engineered by Alva Curtis, Thomson's most able lieutenant.[5] (See Appendix 1.)

One of Curtis' first acts in 1838 as leader of the formidable rival group, the "Independent Thomsonian Society," was to issue a statement of policy:

> This result is to be regretted, as it has the appearance of a split in the Thomsonian ranks, and affords the regulars a plausible pretext for saying that the opposition to their abominable quackery is already divided, and will soon be conquered . . . They [the regulars] need expect no sympathy from the "Independents" in their battles with Thomsonism, nor any conniving with their quackery and murder. Thomsonians are divided, to be sure, into right and left wings, but the regulars will find the columns in both divisions sufficiently deep, active, and persevering, for all their purposes. The steam and lobelia practice, in its most essential features (which for Dr. Thomson's abuse of many of its purest friends and warmest advocates might forever have been called Thomsonian) under whatever name it may hereafter pass, is destined to outlive all others; and will yet be the fashionable practice of this nation and the world.[6]

Curtis' confident prediction that the two factions would present a solid front to the regulars never materialized; the gap between the "left-wing" Neo-Thomsonians and the "right-wing" orthodox followers of Thomson widened rapidly. For a few years the "old patriarch" was able to retain a modicum of organization among his dwindling followers through his "United States Thomsonian Society." With the death of the founder in 1843, however, disorgani-

[3] Hooker, Worthington. *Physician and patient; or, a practical view of the mutual duties, relations, and interests of the medical profession and the community.* New York, Baker & Scribner, 1849, p. 119.

[4] The death of Horton Howard in 1833, leader of the insurgent "Improved Botanics," removed this threat to Thomson.

[5] Berman, Alex. *Op. cit.,* p. 420.

[6] *Botanico-Medical Recorder, or impartial advocate of botanic medicine, and the principles which govern the botanico-medical practice,* 1838-9, Columbus, Ohio, 7 (preface), p. vii.

zation set in quickly among his remaining loyal supporters.

In a little more than a decade after the 1838 schism, a remarkable transformation was discernible. The old Thomsonian crusading zeal, with all its color and fanaticism, was gone. With the abrogation of virtually all restrictive medical regulatory acts, a sense of security permeated the ranks of the Neo-Thomsonian practitioners. To be sure, there were still the "poisons of Allopathy" to inveigh against, but the old cry against the monopolizing schemes of the "Mineral Faculty" was no longer tenable. The mass base of patent right-holders which had formed the strength of the old Thomsonian movement and had given it its impressive grass-roots flavor, had by this time almost melted away. In short, what had been a remarkable socio-medical movement was to become, as the century progressed, merely a small, ineffectual, and pseudo-scientific cult.

A series of important events occurred in 1852. That year, a national meeting of Neo-Thomsonians took place in Baltimore. After debating the adoption of various names, the convention organized itself into the "Reformed Medical Association of the United States," and Alva Curtis was elected as its first president.[7] In addition, Neo-Thomsonian practitioners from the five Eastern states of Pennsylvania, Delaware, New Jersey, Maryland, and Virginia held their first annual meeting of the newly-founded "Middle States Reformed Medical Society."[8] Shortly thereafter, the Neo-Thomsonians in the South formed the "Southern Reform Medical Association."[9]

Probably the most important result of the 1852 meeting of the Reformed Medical Association of the United States was the formulation of the "Baltimore Platform." (See Appendix II.) In the words of one of the speakers at this meeting, its object was to present to the world "a code of medical principles that the community may know what we propose . . . as substitutes for the various systems of medicine popular in our day, and to guard them against the injustice and injury to themselves and us, of attributing to us doctrines which we do not sanction."[10] This document

[7] Such names as the following had been suggested: "Thomsonian, Physiological Medical, Physio-Medical, Physiopathic, Anti-Pathic, Physio-American." See *Physio-Medical Recorder, or impartial advocate of sanative medicine and the principles which govern the physio-medical practice*, 1852, Cincinnati, *18*, 97-99.

[8] *The Middle States Medical Reformer and Advocate of Innocuous Medication*, 1854, Milford, Delaware, *1*, 17.

[9] Wilder, Alexander. *History of medicine*. Augusta, Maine, Maine Farmer Publishing Co., 1904, pp. 589-90. This Southern group was composed of members residing in Virginia, Alabama, Mississippi, Arkansas, Tennessee, and Kentucky.

[10] *Physio-Medical Recorder*, 1842, *18*, 101.

provided a significant test as to who was or was not a genuine Neo-Thomsonian and spelled out the basic tenets of Neo-Thomsonian pathology and therapeutics.

A number of important resolutions were adopted by the Reformed Medical Association of the United States:[11] 1. The members present pledged support of the three principal Neo-Thomsonian schools then in existence;[12] 2. It was decided that three specified medical journals should be supported as reflecting the views of the assembled delegates;[13] 3. A resolution was adopted urging "the importance of encouraging the preparation of genuine sanative agents, and that our new school druggists, *in all cases,* should be patronized in preference to those of other schools";[14] 4. A resolution was passed to fix a uniform scale of fees; 5. On motion of one of the attending members, it was resolved that "those members of the Reformed Medical Profession who choose to assume the cognomen of *Thomsonian* or *Physio-Medical,* be considered as advocates of true sentiments, and be eligible to membership with us by signing our platform of principles";[15] and, 6. It was decided to publish a "United States Reformed Medical Dispensatory," with the responsibility for the task assigned to the faculty of the Metropolitan Medical College in New York City.[16] It is interesting to note that the Reformed Medical Association of the United States ceased to exist after its first meeting in 1852, and it was not until 1883 that a small group of Neo-Thomsonian physicians were to organize another national body called "The American Association of Physio-Medical Physicians and Surgeons."[17]

11 Synopsis of minutes of the proceedings of the Reformed Medical Association of the United States. . ., *Physio-Medical Recorder,* 1852, *18,* 97.

12 The Southern Botanico-Medical College at Macon, Georgia; the Physio-Medical College in Cincinnati; and the Metropolitan Medical College in New York City.

13 *The Southern Medical Reformer,* organ of the Southern Botanico-Medical College; *The Physio-Medical Recorder,* organ of the Physio-Medical College; and a "journal to be established in New York." The New York journal appeared in 1854 under the name of *The Journal of Medical Reform,* and represented the views of the Metropolitan Medical College.

14 *Physio-Medical Recorder,* 1852, *18,* 100.

15 *Ibid.,* p. 99.

16 This Dispensatory was finally written and published in Cincinnati on the individual initiative of William H. Cook in 1869 under the title of the *Physio-Medical Dispensatory.*

17 This writer is in substantial agreement with Wilder who points out that the Botanic practitioners of this period, feeling secure in the absence of restrictive medical legislation, became indifferent to the need for organization. (See Wilder, *op. cit.,* pp. 670-671.) Another factor to be considered in this connection was the constant bickering and feuding among the Neo-Thomsonians and Eclectics.

In 1859, the editor of the *Physio-Medical Recorder* vainly chided the faithful for their indifference to national organization: "It seems high time now . . . for the staunch advocates of sanative medication to meet again and compare notes. Many have fallen off from the ranks since 1852; many have supposed that the Baltimore Platform was a thing of moonshine, to be altered and set aside at pleasure . . ." (*Physio-Medical Recorder,* 1859, *24,* 160.)

For several years, the Middle States Reformed Medical Society held annual meetings, but despite its pretentious claims, its membership remained very small. In 1854, the Society's journal, *The Middle States Medical Reformer,* stated that the organization had only fifty members,[18] but hastened to assure its readers that "These however, constitute, by no means, the whole number of New-School Practitioners in the five states composing our organization. The precise numbers we do not know, but so far as our information extends, there are over 500."[19] Requirements for membership in the Society were graduation from "any respectable and regularly organized medical college"; or an apprenticeship of two years with satisfactory evidence of competence as judged by the Society's Board of Censors. Of course, adherence to the principles of Neo-Thomsonianism was a *sine qua non.*

Of particular interest are the relations between the Middle States Medical Society and the Eclectics. In 1854, the Society made an alliance with the Eclectic Medical College of Pennsylvania, in which a "Union Platform of Principles" was signed by representatives of both organizations. (See Appendix III.) This move was greeted by Alva Curtis in the Mid-West with a suspicious outburst: "We are glad to learn that the Eclectic College has adopted this resolution," he wrote, "but we must watch them . . . we have been told that one of the doctrines of Eclecticism is, that every man is responsible only for himself—that they reject all authority, and make no pledges."[20]

At first it appeared as if the Neo-Thomsonians had swallowed up the Eclectics. The editors of the *Middle States Medical Reformer* could not contain their excitement and enthusiasm:

> . . . The deep and gaping wound with which our professional body has so long suffered, has been entirely healed, and the body restored to pristine health. The true friends of our cause everywhere will hail this as an auspicious event. Hitherto the two New School factions of the Middle States have operated separately, but where was the necessity of so doing? . . . A new era in medicine has commenced. The great brilliant luminary of a legitimate science of medicine is now rising majestically above the horizon.[21]

The following year, the Middle States Reformed Medical Society appointed five delegates to represent it in negotiations with the National Eclectic Medical Association.[22] As it turned out,

[18] *The Middle States Medical Reformer and Advocate of Innocuous Medication,* 1854, *1,* 28.
[19] *Ibid.,* p. 28.
[20] *Physio-Medical Recorder,* 1854, *19,* 118.
[21] *Middle States Medical Reformer,* 1854, *1,* 54.
[22] *Ibid.,* 1855, *2,* 52.

Curtis' warning should have been heeded, for in the course of a few years, the eastern Eclectics gobbled up the Society and its followers. A similar fate overtook the Southern Reform Medical Association.[23]

All staunch and incorruptible Neo-Thomsonians rallied about Curtis and Cook in the Mid-West, where henceforth the sect demonstrated its greatest strength. Wounded by the encroachments of the Eclectics in the East and South, Cook could only rage ineffectually: "It [Eclecticism] is today a more dangerous enemy to medical reform than the bitterest Allopathy is . . ."[24]

For years after the "great schism" of 1838, the Neo-Thomsonians faced a dilemma in naming their organization. Immediately after the split of 1838, the followers of Curtis called themselves "Independent Thomsonians," but this designation was quickly changed to "Botanico-Medicals." In 1851 Curtis, disgruntled, announced, "We never liked the name 'Botanico-Medical' because botany includes all vegetables, bad as well as good. Still it answered our purpose well for thirteen years, and we resume it for the sake of uniformity."[25] The following year, just before the Baltimore convention, Curtis issued an *ex cathedra* statement:

> Let the *name*, then, be not Eclectic which signifies merely choosing and refusing (as all doctors do); nor Botanic, which signifies vegetable *poisoning* as well as *curing;* nor Thomsonian, which directs the mind as much to Thomson as his principles; nor Physopathic which signifies windy disease—But Physio-Medical, which signifies natural-medical, or curing according to nature . . . This is the most appropriate name yet proposed.[26]

Despite Curtis' attempt to pressure all Neo-Thomsonians to adopt the name "Physio-Medical" at the Baltimore Convention, the majority vote at that meeting was in favor of the name "Medical Reform."[27] In the course of a few years, the appellations "Physiopathic," "Physo-Medical," and "Medical Reformers" assumed by certain Neo-Thomsonians, passed out of existence, and the designation "Physio-Medical" became synonymous with Neo-Thomsonianism.

No further organizational activity on a national level occurred among the Neo-Thomsonians until 1883, when a call was sent out "to every *true and genuine* Physio-Medicalist on the American Continent, to meet in a grand convention in the City of Indianapolis, Indiana, on the first Wednesday in May 1883, for the pur-

23 Wilder, *op. cit.*, p. 592.
24 *Physio-Medical Recorder*, 1867, *31*, 228.
25 *Botanico-Medical Recorder*, 1851, *18*, 26.
26 *Physio-Medical Recorder*, 1852, *18*, 1.
27 *The Middle States Medical Reformer*, 1854, *1*, 44.

pose of organizing a National Association."[28] The circular letter announcing this call was initiated by three State Physio-Medical Societies (Indiana, Ohio, and Illinois),[29] and was signed by ninety-three names from "twenty-three States and Provinces."[30] Meeting at the designated time and place, the convention created the "American Association of Physio-Medical Physicians and Surgeons." Forty-eight persons were designated charter members, and a Platform of Principles, Constitution and By-laws," was drawn up. (See Appendix IV.)

There is a record of the American Association of Physio-Medical Physicians and Surgeons meeting for a three-day annual convention in Dallas, Texas, as late as May 1907.[31] After this date, the fate of the organization, if it still existed, is completely obscured through lack of data.

II.

The establishment of the first chartered Neo-Thomsonian medical school by Alva Curtis in 1839 at Columbus, Ohio, was greeted with derision by the regulars and the "Beachites," and became the target of savage and sarcastic criticism by the orthodox Thomsonians. "It appears that the Curtico-Botanico-Medical College has been chartered by the Ohio Legislature," sneered the editor of the *Boston Thomsonian Manual*. "We had heard a great deal about Dr. Curtis and his school, and the wicked Legislature of Ohio, who would not grant him a charter, but we never dreamed that it was his intention to make the healing art an odious monopoly and imitate the regular medical profession by conferring a sheepskin diploma. But so it is; and the Thomsonians must endeavor to rub along as well as they can without the aid of diplomas and colleges."[32]

To make matters worse, all staunch followers of Samuel Thomson were thrown into deep consternation when Dr. Lanier Bankston, the "Curtis of the South," secured a charter from the Georgia Legislature for the Southern Botanico-Medical College at Forsyth,

[28] *Cincinnati Medical Recorder*, 1883, *61*, 63. The circular letter defined "true and genuine" Physio-Medicals as "those whose practice conforms to the great Physio-Medical doctrine of rejecting all poisons. And those who are not *true and genuine* in this sense, as also those who have diplomas procured by money or otherwise fraudulently, and those who sell or issue such fraudulent diplomas, and all who procure abortion, or otherwise are guilty of criminal practices, shall be debarred from the deliberations of this meeting." (*Ibid.*, p. 63).

[29] *Ibid.*, pp. 61-62.

[30] *Ibid.*, p. 72.

[31] *Physio-Medical Record*, Indianapolis, 1907, *10*, 72.

[32] *The Boston Thomsonian Manual and Lady's Companion*, 1839, *5*, 171.

Georgia, that same year.[33] Thus, with two Neo-Thomsonian schools opening in 1839, the new trend in education among the "left-wing" Thomsonian faction was off to a good start. In all, eight Neo-Thomsonian schools were chartered before 1861:[34]

1. *Literary and Botanico-Medical Institute of Ohio* (1839), Columbus, Ohio. This institution moved to Cincinnati in 1841. After many vicissitudes and changes of name, it finally became the Physio-Medical College of Ohio, closing in 1880.

2. *Southern Botanico-Medical College,* chartered in 1839 at Forsyth, Georgia. Two grants of $5,000 each were voted to this school by the State Legislature. The name of the college was changed to Reformed Medical College of Georgia in 1854. Suspended in 1861 and revived in 1867, it underwent another change in name, becoming the American College of Medicine in 1874. It finally merged with the Georgia Eclectic College in 1881.

3. *Alabama Medical Institute,* Wetumka, Alabama. Received a charter in 1844, but closed in 1845 after only one session. The faculty had been composed of seceding professors from the Southern Botanico-Medical College.

4. *Botanico-Medical College of Memphis,* Memphis, Tennessee. Chartered in 1846, the faculty had come largely from the defunct Alabama Medical Institute. In 1859 the institution became Eclectic, changing its name to Eclectic Medical Institute of Memphis. The college closed in 1861.

5. *Scientific and Eclectic Medical Institute of Virginia,* Petersburg, Virginia. Chartered in 1847, this school was "Eclectic" in name only.[35] Torn asunder by faculty squabbles, the college lasted only a few years.

[33] Wilder, *op. cit.,* p. 500 and p. 525.

[34] Information on these schools was derived in part from the findings of F. C. Waite, American sectarian medical colleges before the Civil War. *Bull. Hist. Med.,* 1946, *19,* 148-166; also from Wilder's *History of medicine;* and from a number of Neo-Thomsonian journals.

[35] For example, it was announced by one of the professors of the school in 1848 that "We are pleased to find all our students to be fully established in the fundamental doctrines of Thomsonism. There are no mongrels amongst us; none that advocate the peculiar notions of the Beachites . . . We are all very far from confounding the *name* of an Institution with the doctrines taught therein. Although our college is called the Eclectic Institute of Virginia, yet our students will all bear witness, that the doctrines herein taught, are in perfect accordance with the fundamentals of Samuel Thomson. They wish it fully understood that our Institute is not the advocate of the peculiar notions of those termed Eclectics in the West, but that we are Eclectics in the broad sense of the word, which leads us to

'Seize upon truth wherever found
On Christian or on heathen ground,'—

to select, from the accumulated wisdom of the past . . ." (*New England Botanic Medical and Surgical Journal,* 1848, *2,* 14.)

METROPOLITAN MEDICAL COLLEGE.

The second course will be opened on the second Monday of the coming March, at the Hall, 68 East Broadway.

The whole fees for matriculation, Museum, Hospital privileges, and Lectures in all the departments will be, - - - - - - $100,00

Graduation fee, - - - - - - - - - - 20,00

Indigent Students may make private agreement with the Faculty, so that they may secure their attendance on less terms.

An advertisement of the Metropolitan Medical College which appeared in the College's publication, the *Journal of Medical Reform*, Vol. I, 1854. Note the Botanic establishment of Law and Boyd on the street level of the school building.

6. *Worcester Medical School*, Worcester, Massachusetts. This school was established in 1846, but was unsuccessful in obtaining a charter from the Massachusetts Legislature. In order to circumvent this situation, the Worcester school made an ingenious arrangement to become a branch of the Southern Botanico-Medical College, located approximately 700 miles away. In this capacity, and using the name Worcester Botanico-Medical College it was able to grant degrees in 1846 and 1847 under the charter of the Georgia institution. Terminating its connection with the Georgia school in 1848, it entered into a similar arrangement that same year with the Scientific and Eclectic Medical Institute of Virginia. Under the terms of this agreement, the Worcester school again changed its name to New England Botanico-Medical College. Finally, in 1851, it obtained a Massachusetts charter and operated independently until its demise in 1859.[36] It is interesting to note that probably the most erudite Neo-Thomsonian, Dr. Calvin Newton, was the founder of this school and, until his death in 1853, its chief attraction.[37] In 1852, Newton joined the Eclectics and became that year the President of the National Eclectic Medical Association.

7. *Metropolitan Medical College* in New York City.[38] A charter for this school was secured in 1850. During its last few years of existence it was captured by the Eclectics. Dissension among the faculty as well as a scarcity of students caused the school to close in 1862.

8. *Physio-Medical Institute*, Cincinnati, Ohio. Established in 1859 as a rival of the Physio-Medical College, this school closed in 1885. Waite points out that this institution had only fifteen graduates prior to 1861. After the Civil War, the number of graduates continued to be very small.

[36] For an exhaustive study of the history of this school, see Waite, F. C. The first sectarian medical school in New England, at Worcester (1846-1859), and its relation to Thomsonianism. *New Eng. J. Med.*, 1932, *207*, 984-988.

[37] Calvin Newton (1800-1853), graduated from Union College in 1826 and from Newton Theological Institute in 1829; served as Baptist minister (1828-1831); Professor of Rhetoric and Hebrew at Waterville (now Colby) College, Maine (1831-1838); Professor and President of the Theological Institute at Thomaston, Maine; entered Berkshire Medical Institution in 1842 and received M.D. degree in 1844; became a Fellow of the Massachusetts Medical Society (1845); embraced Neo-Thomsonianism and founded Worcester Medical School (1846); President of the National Eclectic Medical Association (1852); editor of *New England Eclectic and Guide to Health*, Worcester, 1846 (title later changed to *New England Botanic Medical and Surgical Journal*).

[38] *The Journal of Medical Reform*, organ of the Metropolitan Medical College, ran an announcement describing the aims of the College as follows: "The teachings of the Metropolitan will be strictly based upon the doctrines contained in the Platform of Principles of Medical Reform, adopted by the National Reform Convention in the city of Baltimore in 1852 . . . for this Reform we claim Dr. Samuel Thomson of New Hampshire, the father and founder . . . we think to Samuel Thomson belongs the honor of being considered the father of this Reform, and to whom the world is indebted." (*J. med. Reform*, N. Y., 1854, *1*, 251.)

No attempt has been made in this study to evaluate the foregoing schools, but Waite has indicated that they were considerably inferior in caliber to those of the regulars, and that the number of graduates was comparatively small. The subjects taught and the duration of study at these Neo-Thomsonian institutions were similar to those of many regular proprietary schools of the period, with the exception of the distinctive therapeutics and pathology.

Three schools listed above continued to operate after the Civil War, with the last one, the Physio-Medical Institute, closing in 1885. As for the few Neo-Thomsonian colleges which came into existence in the post-Civil War period, three were still functioning in the first decade of the twentieth century:[39]

1. The Physio-Medical College of Indiana, Indianapolis, organized in 1873.
2. College of Medicine and Surgery, Chicago, organized in 1885 as the Chicago Physio-Medical Institute.
3. Physio-Medical College of Texas, Dallas, organized in 1902.

By 1910, only the Illinois school was still in existence; after this date, it, too, became defunct.[40]

The ridiculously small number of students graduating from the three combined Neo-Thomsonian medical colleges from 1901-1908 can be seen from the following statistics published in the *Journal of the American Medical Association:*[41]

1901—18 students	1905—22 students
1902—16 students	1906—22 students
1903—24 students	1907—11 students
1904—20 students	1908—12 students

III.

The Neo-Thomsonian trend was accompanied not only by striking innovations in therapeutics, organizational structure, and education, but also by a different kind of pharmaceutical activity. The large-scale manufacture, distribution, and sale of Thomsonian remedies involving numerous agents and many unauthorized persons, which had been such a remarkable feature of the old movement, had disappeared. By mid-nineteenth century, there were no longer thousands of patent right-holding followers of Thomson to support such activity.

[39] *J. Amer. med. Ass.*, 1903, *41*, 438-439; 448.
[40] *J. Amer. med. Ass.*, 1910, *55*, 668-669.
[41] *J. Amer. med. Ass.*, 1908, *51*, 607.

Indeed, scrutinizing this trend closely, it becomes increasingly difficult to speak of Neo-Thomsonian pharmacy per se. The old Thomsonians had been able to build up an extensive pharmaceutical apparatus to serve the needs of their adherents, but the Neo-Thomsonian practitioners were too weak and few in numbers to muster pharmaceutical resources comparable to those of their crusading forebears. Moreover, the rapid rise of an impressive Eclectic pharmaceutical industry in the 1850's completely submerged and overshadowed the few ineffectual attempts of Physio-Medical physicians to create a distinctive pharmacy of their own. For a good part of the century, Neo-Thomsonian pharmacy may properly be regarded as an appendage of Eclectic pharmacy, as subsequent discussion will show.

Intense excitement prevailed among the Eclectics in the late 1840's when W. S. Merrell of Cincinnati began marketing "concentrated" Eclectic remedies.[42] Numerous competing manufacturers immediately followed suit, and before long a lucrative industry had evolved. The Neo-Thomsonians were quick to endorse the new "concentrated" remedies. An editorial appearing in the *Physo-Medical Recorder,* organ of the Physo-Medical College of Cincinnati,[43] praised the advent of these medications as "a glorious work of Medical Reform,"[44] without bothering to give the Eclectics credit for this development. "No one is a greater lover of the different baths [vapor] than ourself, or has a higher appreciation of emetics and enemas," the editor reassured his readers.[45] But, if the new "concentrated" preparations worked as well and were easier for the patient to take and for the physician to administer, he argued, then why not adopt them? Attacking the regular physicians for their employment of poisonous alkaloids, the writer conceded that these plant derivatives had done much to make the allopathic practice "acceptable and popular." Then, contrasting the regular alkaloidal pharmacy with the "New School" pharmacy, the editor wrote:

> . . . but how different their articles are from ours. They extract proximate principles, many of which are most deadly in their character . . . from the

[42] Lloyd, John Uri. *The eclectic alkaloids . . . etc.*, Bulletin of the Lloyd Library no. 12. (Pharmacy Series no. 2) Cincinnati, 1910; and the condensed version of this work, *A treatise on the American alkaloids, resins, resinoids, oleo-resins and concentrated principles (so-called Eclectic concentrations),* Drug Treatise no. XXIV, Cincinnati, 1909. These two works are authoritative and indispensable histories of Eclectic concentrated remedies.

[43] For a brief period, the name "Physo-Medical" was used, but was subsequently dropped for "Physio-Medical."

[44] *Physo-Medical Recorder and Surgical Journal,* Cincinnati, 1850, *18,* 167.

[45] *Ibid.,* p. 165.

poppy they extract their morphine; from the strychnos (nux vomica), they extract their strychnine, two grains of which will kill; from cinchona, they extract their quinine, etc., etc.

Now our agents are reduced to a concentrated form without breaking up the relations existing between the proximate principles. For example, we reduce lobelia to so concentrated a form, that from three to five or ten drops upon loaf sugar, or dropped into water, are sufficient to produce emesis; still this article is not lobelina, one of the proximate principles of lobelia . . .[46]

Finally the writer, in a burst of enthusiasm, concluded that because of this "great improvement . . . we feel more than ever inclined to the belief that the Physo-Medical Practice will soon, very soon, become the most popular and successful practice of medicine."[47]

As mentioned earlier, a resolution had been passed at the Baltimore Convention urging patronage of "New School Druggists . . . in preference to those of other schools." Who these "New School Druggists" were can be seen by examining the advertisements in the Neo-Thomsonian journals of the period. The Physio-Medical practitioners in the Cincinnati area apparently favored the concentrated remedies of F. D. Hill and Company of Cincinnati, who advertised "the Most Improved Method of preparing the Concentrated Medicines . . . all articles belonging to the list of Drugs and Medicines used by Thomsonian and Botanic Physicians."[48] From the available data, it would seem that the Eclectic establishments were well patronized. For example, the concentrated preparations of the American Chemical Institute, an Eclectic firm controlled by B. Keith and Company, for whom the wholesale botanic house of Coolidge, Adams and Bond acted as agents, were advertised in the *Journal of Medical Reform*. Similarly, the wholesale botanic druggists, Law and Boyd, offered for sale their concentrated preparations in the same journal without, however, divulging the manufacturer.

The *Middle States Medical Reformer* was an ardent champion of concentrated preparations. It taunted the regulars for their reliance on calomel in liver complaints:

We are often gratuitously informed by persons who wish to say something in favor of the crumbling fabric of Allopathy, that nothing will act on the liver but calomel . . . If such persons wish to know better, they can be very easily taught—call upon any New-School Druggist and procure a dose of Podophylline or Leptandrine; the former which will act with much greater

[46] *Ibid.*, p. 167.
[47] *Ibid.*, p. 168.
[48] *Botanico-Medical Recorder*, 1852, *18*, 191.

power upon the liver, exciting copious flow of bile, without poisoning the blood, *as mercury* . . . Will our Allopathic friends try them?[49]

In 1856, the Middle States Reformed Medical Society unreservedly endorsed the use of concentrated medicines at its fifth annual meeting in Philadelphia.[50] By this time, the Physio-Medical practitioners were patronizing Eclectic establishments, wholesale botanic druggists who stocked Eclectic remedies, and even regular drug stores. The new concentrated Eclectic remedies were being sold through regular retail drug channels soon after their appearance on the market. Advertisements for these products are to be found in the very first volume of the *American Druggist's Circular and Chemical Gazette* (1857).[51]

This does not mean that the Physio-Medical practitioners used only Eclectic concentrated remedies. In a report delivered at the convention of the Middle States Reformed Medical Society referred to above, it was authoritatively recommended that infusions, decoctions, and syrups should be retained as "adjunctive aids," and that extracts and tinctures should not be completely abandoned in favor of concentrates.[52]

In the succeeding years, the Physio-Medical physicians occasionally expressed their dissatisfaction at their inability to establish Physio-Medical pharmacies, as well as with the shortcomings of the botanic wholesale houses and regular drug stores. For example, in 1858, a disgruntled Neo-Thomsonian practitioner wrote to the editor of the *Physio-Medical Recorder* to complain about drug adulteration:

> I am satisfied that our Reform physicians are not careful enough in selecting their medicinal agents. The manufacture of botanic medicines has become a lucrative business; and unprincipled men, disregarding the direful consequences, are adulterating our most sanative preparations. It is not uncommon to find, in our wholesale drug stores lobelia seed adulterated with tobacco, pulverized capsicum with logwood, ginger with corn meal, cream of tartar with alum, jalap with sawdust, etc. . . . Brothers in medical reform, if we can not get pure articles prepared for our immediate use, let us go into the laboratory prepared by the God of nature, and find for ourselves, in this crude state, the healing remedies of a beneficient Creator.[53]

It was, of course, commonplace for many of the old "steam and puke doctors" to go out into the country and gather medicinal

[49] *The Middle States Medical Reformer*, 1854, *1*, 13.
[50] *Ibid.*, 1856, *3*, 49.
[51] For example: W. S. Merrell and Co. of Cincinnati, on p. 119; B. Keith and Co. of New York on p. 85; Coolidge and Adams, Wholesale Botanic Druggists of New York on p. 85; and Jacob S. Merrell of St. Louis, on p. 57.
[52] *The Middle States Medical Reformer*, 1856, *3*, 60.
[53] *Physio-Medical Recorder*, 1859, *24*, 83.

plants. But these new practitioners were a different breed of men. Many of them were now the proud possessors of diplomas and M.D. degrees, and the threat to "go into the laboratory prepared by the God of nature" was purely rhetorical.

At an annual meeting of the Indiana Physio-Medical Association in 1895, a prominent spokesman of the cult complained rather bitterly that "We are depending too much on the pharmacists of the old school . . . we should have a Physio-Medical Pharmacy."[54] Another speaker joined in to approve the sentiments of his colleague: "We need efficient, conscientious Physio-Medical pharmacists to manufacture and prepare Physio-Medical remedies for Physio-Medical physicians . . ."[55] The Neo-Thomsonians were unable, however, to attain this goal. Unlike their belligerent predecessors, and their Eclectic rivals whose pharmaceutical activities are of considerable interest and importance, these new Thomsonian practitioners caused hardly a stir on the pharmaceutical scene.

IV.

Despite all exhortations and opposition by Thomson, a considerable expansion in the Thomsonian materia medica had already taken place during the founder's lifetime. By 1869, with the appearance of William Cook's *Physio-Medical Dispensatory*, the original core of 70 plant drugs employed by the old Thomsonians had been increased five-fold.

Nor was this all. Samuel Thomson's crude pronouncements about the nature of disease had been elaborately restated by the Neo-Thomsonian practitioners in quasi-scientific and metaphysical terms. A vitalistic pathology was formulated in which disease was regarded as a unit, and fever proclaimed as a beneficient manifestation of the "life principle." The most authoritative expression of these views was presented in the "Baltimore Platform" of 1852 (see Appendix II) and continued to be promulgated with certain refinements by this sect up to the time of its virtual extinction, about 1910.[56]

Great emphasis was laid by Neo-Thomsonians on the use of "sanative" or "non-poisonous" medication. The regular practitioners, as well as physicians of other schools, were accused by Wil-

[54] *Physio-Medical Journal, Indianapolis*, 1895, 21, 174.

[55] *Ibid.*, p. 174.

[56] There were undoubtedly still some Physio-Medical physicians practicing after this date, but this writer has been unable to find any publications or data which would indicate any organizational activity after 1910.

liam H. Cook of using poisonous and disease-producing remedies. Of the "allopathic" practitioners, Cook wrote as follows:

> The Allopathic rule in treatment seeks the removal of one disease by making another disease in its place . . . and this doctrine permeates everything that comes from Allopathy. Out of this springs its other proposition, *Ubi virus, ibi virtus*—where there is poison, there is virtue. If disease is to be made, poisons must be used for the purpose; and it is only on this ground that calomel, antimony, arsenic, blisters, iodine, opium, veratrum, gelsemium, strychnine and other destructive agents were introduced as remedies . . . Hence while that school has made such progress in Anatomy, Physiology, Symptomology, Diagnosis and kindred topics, it has steadily conformed its Materia Medica to the rule of using poisons; and its entire numbers and influence have ever been used to oppose every suggestion in practice that did not accord with its primeval pathology . . .[57]

In a savage attack against the Eclectics, Cook denounced them for using "deleterious agents," and compiled a list of "poisons" which he claimed the Eclectics were administering.[58]

A pertinent question that might be asked at this point is how the Neo-Thomsonians defined or determined what was "poisonous." All their definitions were obscure and subjective, apparently influenced by either grossly speculative or empirical factors. Definitions such as the following are given for a "poison": "Any article to which human experience attaches the term *poison* is dangerous to the human frame and at war with vitality";[59] or "every means and process, which, in its nature and tendency, in authorized medicinal quantities, degrees or modes of application, has been known to have directly destroyed human life, or permanently injured the tissue or deranged the physiological action." (*Baltimore Platform*); or "Every article, means or process of cure which . . . is directly antagonistic to the laws of vitality" (*Union Platform of Principles*, see Appendix III). For example, during the meeting of the Illinois Physio-Medical Association in 1865, gelsemium and veratrum were considered deleterious within the meaning of these

[57] Cook, W. H. *The physio-medical dispensatory*. Cincinnati, 1869, pp. 5-6.

[58] *Physio-Medical Recorder*, 1865, *29*, 189. Cook wrote: "These lists I have prepared with the utmost care from the latest editions of the several Eclectic textbooks." The following is Cook's list of "poisons" used by the Eclectics:

Fowler's Solution	Hyoscyamus
Antimony Chloride	Stramonium
Litharge and lead acetate	Digitalis
Copper Sulphate	Veratrum
Iodine	Aconite
Zinc Salts	Conium
Silver Nitrate	Cannabis Sativa
Bismuth Salts	Bitter Almond
Gold Chloride	Strychnine
Opium and derivatives	Prussic Acid
Belladonna	Ergot

[59] *Cincinnati Medical Recorder*, 1883, *61*, 133.

definitions and officially proscribed.[60] Taunted by his enemies for not having effective drugs in the Physio-Medical materia medica to alleviate pain, Cook retorted:

> It is often charged against Physio-Medicalism, that it cannot relieve pain as effectively as can be done by the narcotics of Allopathy and Eclectism. This is a mistake. Our agents can secure more effective relief . . . the list [Physio-Medical] already known is far greater than is generally supposed. Among them may be mentioned blue cohosh, mullen, bugle weed, cockle burr, greek valerian, twin leaf, yellow poplar, and at least a dozen others. They are positive and reliable in giving relief to pain . . .[61]

Necessity sometimes forced the Neo-Thomsonians to accept medicinal agents or adopt curative measures which had been authoritatively pronounced deleterious by their leaders. An early example occurred in 1837, when the respectable editor of *The Southern Botanic Journal,* Dr. D. K. Nardin, scandalized his Thomsonian colleagues by advocating the use of quinine sulfate in "chills."[62] Nardin was severely scolded by William H. Fonerden, a prominent Thomsonian, who argued that "if Dr. Nardin may add one article to the materia medica [Thomson's materia medica] I may add another, and so may others ad infinitum, until we have a volume as ponderous as Wood and Bache's American Dispensatory."[63] Furthermore, maintained Fonerden, Nardin was violating a basic principle of Thomsonian therapeutics which always called for the use of general remedies. "A local specific is a general poison," Fonerden reminded Nardin. "This is a favorite axiom with Thomsonian physicians. To those I may add, 'a limited remedy is a general bane.' Is the sulphate of quinine, doctor, a limited or general remedy? Would you prescribe it in every case of disease? I know you would not."[64] Other arguments advanced by Fonerden against the use of quinine were: (a) Dr. Thomson forbade the use of minerals, and since quinine sulfate was a combination of "a tonic extract of Peruvian bark and sulphuric acid," it could not be safely administered; and, (b) It was "equivocal" in action, causing many side-effects.

To these arguments Nardin retorted that he could not see why quinine was more "equivocal" than many remedies in Dr. Thom-

[60] Illinois P-M Association. Report of Proceedings of Its Eighth Annual Convention. *Physio-Medical Recorder,* 1865, *29,* 197.

[61] *Physio-Medical Recorder,* 1868, *32,* 126.

[62] *The Southern Botanic Journal, Devoted to the Dissemination and Support of the Thomsonian System of Medical Practice,* Charleston, S. C., 1837-8, *1,* 197. This is the earliest example of the use of quinine by a Thomsonian that this writer has been able to discover.

[63] *Ibid.,* p. 402.

[64] *Ibid.,* p. 403.

son's materia medica; that although common table salt was composed of two deadly mineral poisons, and eggs contained sulfur, they were nevertheless consumed by everyone; and finally, that Fonerden's remarks about general remedies were "overstrained." These heretical opinions were concluded with a burst of defiance:

> With regard to our prescribing quinine to stop chills we shall make no further apology, nor assign any other reasons than that of *absolute necessity*, although we had previously subjected our patients to a vigorous course of Thomsonian medicines daily, for many weeks; and we failed several times where quinine given by others performed cures.[65]

As late as 1865, no agreement could be reached at a meeting of Physio-Medical practitioners on whether to sanction the use of quinine,[66] and it was not until 1869 that all taint was removed from the drug, through its inclusion in Cook's *Physio-Medical Dispensatory* as a "sanative" remedy.[67]

There is reason to believe that the influence of independent Botanic leaders such as Elisha Smith and Thomas Cooke served to accelerate the Neo-Thomsonian trend. Smith's *Botanic Physician* (1830) was the first significant attempt at a scientific synthesis of the Botanic practice. This work strongly emphasized the need for an expanded plant materia medica and a judicious inclusion of some mineral remedies. It was noteworthy for its stress on the need to study all branches of medicine, including surgery. This approach was also taken by Thomas Cooke in the pages of his journal, the *Botanic Medical Reformer and Home Physician*. In a significant editorial, Cooke pointed to the contrast between the therapeutic practice of the independent Botanic and the old-fashioned Thomsonian physician:

> The Thomsonian practitioners, it is pretty generally known, adhere strictly to the manner of practice recommended by Dr. Samuel Thomson, (which consists principally of giving *courses* of medicine, such as stimulating, puking, steaming, and the shower bath, with such other directions as Dr. Thomson gives in his "New Guide," discarding in toto Cathertics, Laxatives, and other means recommended by other well experienced Botanic authors. And we will here state that Botanic Physicians make use of all the articles recommended by Dr. Samuel Thomson, when they deem them necessary: hence, a Botanic practitioner has all the Thomsonian remedies, while the Thomsonian has no other except those which are laid down in the "New Guide." And we believe there is not a person living but would rather take any of our more mild remedies, than resort to the *coursing* practice . . .[68]

[65] *Ibid.*, p. 404.
[66] *Physio-Medical Recorder*, 1865, *29*, 200.
[67] *Physio-medical dispensatory*, p. 346.
[68] *The Botanic Medical Reformer and Home Physician*, 1841, *1*, 121.

By the 1840's, many Thomsonians had begun to practice what the independent Botanic physicians had been preaching for considerably more than a decade. In 1865, William H. Cook announced heatedly that "very many people still think our system can do little else than give emetics and baths; and only a limited number of persons understand that we have an extended system of scientific principles."[69]

But try as they might, the Neo-Thomsonians could never achieve more than a pseudo-scientific therapeutics. As the century wore on, it became apparent that the dogma-ridden leaders of this ever-shrinking sect were unable to grasp the implications in the dramatic emergence of bacteriology, immunology, and synthetic organic medicinals. As late as 1907, a professor at the Physio-Medical College of Indiana warned his students that "if you ever hope to become expert in diagnosis and treatment of the sick, you must throw aside the pernicious doctrine of *disease-entity*, a *bacterial* pathology or a microbe disease maker, and *chemical therapeutics* or the doctrine that the living body is simply a chemical laboratory to be ruled only by the chemist. I do declare to you that the so-called 'disease germ' is a monumental medical bugbear, it is the greatest romanticism of the age."[70]

In 1906, a woman graduate of the Physio-Medical College of Indiana received permission to matriculate for a course in obstetrics and gynecology in the medical school of the University of Strassburg, on the strength of her diploma and her Indiana State license. In a letter to the editor of the *Physio-Medical Record*, she praised the remarkable technical facilities of the University, but contemptuously dismissed the prevailing therapeutics. "Of course," she wrote, "I would not for all the world give up my knowledge of Physio-Medical treatment for their superior technic."[71] She then proceeded to tell of her successful treatment of patients with "leptandra virg. and zingiber," and "as I had nothing else on hand I made a strong solution of No. 6 and bathed a burned hand . . . The patient said 'it was a little hot,' but she thought it healed very fast . . ."[72] For a fleeting instant, the ghost of Samuel Thomson, vindicated, hovered over the Medical Faculty of the University of Strassburg!

69 *Physio-Medical Recorder*, 1865, *29*, 73.

70 *Physio-Medical Record*, 1907, *10*, 127.

71 Letter to Dr. Haggard, editor. From Dr. Th. Rimmelin, Schiltigheim. Strassburg, Elsass, Germany. Dec. 12, 1906. *Physio-Medical Record*, 1907, *10*, 42-45.

72 *Ibid.*, p. 45.

APPENDIX I

(An attack made by Morris Mattson, spokesman for Samuel Thomson, against the Alva Curtis faction which seceded during the seventh national Thomsonian Convention in 1838. From *The Boston Thomsonian Manual and Lady's Companion*, 1838, 5, 8-11.)

The enemies of Dr. Thomson have stated that he urged a dissolution of the old convention, from a desire to monopolize the sale of medicines. It was his principal aim to propose such measures as were calculated to keep his system in the hands of the *people*, and to prevent them from being imposed upon by a junto of designing knaves, who have used every effort to trample Dr. Thomson in the dust.

The individuals composing this *scare-crow* faction were headed by that ineffable nuisance, that notorious drunken sot, Dr. Draper, who had probably procured a short respite from Moyamensing for that important service. After the old convention had dissolved, and the mongrels discovered the impossibility of hanging on any longer by the skirts of the Thomsonians, Dr. Draper interrupted the assembly with one of his billingsgate speeches, in which he proposed that his followers should adjourn to a tavern in Chestnut Street (Philadelphia), and there organize an 'Independent' convention. The suggestion was carried into effect, and after a two days' session, they had matured a constitution, passed sundry resolutions, and adjourned to meet within a year, in New York City.

Now this was all well enough, with the exception that they should not have christened themselves the '*Thomsonian*' society . . . If they can do without Dr. Thomson's system, they can certainly do without his *name*. They should have styled themselves the '*butternut society*' or the 'purifying syrup society.' Either of these would have been far more appropriate than the one selected.

This tavern convention, we perceive, consisted of about thirty members. Ephraim Larabee of Baltimore, a notorious vender of secret nostrums, was the president. We find the names, also, of John A. Brown of Providence, R. I., one of the most noted of the mongrels; B. W. Sperry of New Haven, Conn., a man who, unless very much belied, uses opium and laudanum in his practice in disguise, and engaged in printing a *counterfeit* edition of the New Guide; A. C. Draper, of almshouse and Moyamensing notoriety; William Armstrong, a vender of Jewett's liniments; William Burton and Samuel Ross of Philadelphia, well known in that city for their abominable quackery, and sale of secret compounds; James Thorn (called, par excellence, doctor), the Pennsylvania agent for the sale of Howard's *improved* system of medicine; and last, though not least, Dr. Curtis of Columbus, Ohio. . . .

APPENDIX II

(From *The Physio-Medical Recorder or Impartial Advocate of Sanative Medicine*, 1852-53, *18*, 155-6.)

Platform of Principles
Adopted by the National Convention at
Baltimore, October 1852

Whereas, There have arisen in different ages and countries, and of every sect in medicine, men of noble minds and benevolent hearts, who exerted

all their energies to reform the errors and abuses of what was called the science and practice of medicine;

And whereas, The men of this description of the Allopathic school are still compelled to pronounce their principles as "incoherent assemblage of incoherent ideas;" and their most efficient medication "horrid, unwarrantable, murderous, quackery;"

And whereas, Many modern New School reformers of the same honest intentions, have few fixed principles of practice in which they can agree, and no firm bond of union in effort for the promotion of Reform;

Therefore, It appeared to be the first and most important duty of this convention to point out the generative errors of all the popular systems of the day, and to lay down in clear and unmistakable terms the fundamental principles of true Medical Science and practice, as guides to all who may desire to attain to perfection in the knowledge of the Healing Art, and as a common creed, which all can advocate and defend, and as a bond of union in effort for the promotion of this most glorious cause of science and humanity; Therefore

Resolved, By the Reformed Medical Association of the United States, that medical science pertaining altogether to natural subjects, must be in itself as fixed and definite as any other natural science.

Resolved, That the reason why medical men have not learned it, is they have attempted to base it upon the violation of physical laws, which are ever variable, instead of those laws themselves, which are immutable; they have built their system on what they call pathology—or rather they have pronounced that pathology which is only deranged physiology, and built upon this error.

Resolved, That the Reformers of past times have failed to perfect their practice, because of the impossibility of doing it while they retain the false notion that the science is based on pathology, or the doctrine that physiological derangements are disease.

Resolved, That the fundamental principles of true medical science are not pathological but physiological.

Resolved, That disease is not vital action deranged, or obstructed, increased, or diminished, but any condition of the organs in which they are unable to perform their natural functions: a condition that permanently deranges, obstructs or diminishes vital action, and in this sense is a unit.

Resolved, That irritation, fever, inflammation—terms used to signify increased, deranged, obstructed, or accumulated vital action in the nervous or vascular systems, are not disease, but physiological symptoms of disease; and are not to be directly subdued, but always to be aided in their ultimate design and intention in removing obstructions and restoring the nervous and circulatory equilibrium.

Resolved, That suppuration is to be encouraged and promoted whenever there is accumulated morbific matter to be removed; that gangrene, being no part of inflammation, but a purely chemical process in opposition to all vital action, and occurring only when vital action has wholly ceased, the associating of it with inflammation, and treating the latter as tending to terminate in the former, has been a source of immense mischief in medication.

Resolved, That it is the duty of the practitioner to reject in toto every means and process, which, in its nature and tendency, in authorized medicinal quantities, degrees or modes of application, has been known to have directly destroyed human life, or permanently injured the tissue or deranged the physiological action, and use those only, which have a direct tendency

to aid the vital organs in the removal of causes of disease and the restoration of health and vigor.

Resolved, That the agents of this character are not confined to the vegetable kingdom, but are found in every department of nature, and to be "seized upon wherever found."

Resolved, That though we shall exercise charity toward the ignorance and prejudices of all men, we can count no one a true medical reformer who rejects the doctrines of the foregoing resolutions.

APPENDIX III

(From *The Middle States Medical Reformer, and Advocate of Innocuous Medication*, Milford, Delaware, 1854-5, *1*, 52.)

Union Platform of Principles

(Subscribed to by the Middle States Reformed Medical Society and the Faculty of the Eclectic Medical College of Pennsylvania)

Whereas divisions have occurred among medical reformers, and various parties have arisen entertaining different views only upon some of the minor points of true medical science and practice; and whereas these divisions have greatly retarded the progress of scientific medicine: we the members of the Middle States Society of Medical Reform, do agree to unite with our Eclectic friends upon the following platform of principles.

1st. The fundamental principles of true medical science are not Pathological but physiological.

2nd. Disease is not vital action deranged or obstructed, increased or diminished, but disease we understand to be that condition of a part which disqualifies it for the performance of its function in a normal manner.

3rd. Fever is a manifestation of an effort of the system to remove disease, a physiological action under the circumstances—a general or constitutional indication of disease.

4th. Inflammation is an evidence of local disease—an action produced for the restoration of a diseased part—an effort of the vital force to remove disease.

5th. Physiology is the science of life in its modes of being, but is now usually restricted to life in a state of health.

6th. Pathology is the science of life in a state of disease. It is physiology under abnormal circumstances.

7th. Holding these views, which are legitimate teachings of physiological science, we reject from our materia medica every article, means or process of cure which . . . is directly antagonistic to the laws of vitality, and use those and those only which have a direct tendency to aid the vital organs in the removal of the causes of disease, and the restoration of health and vigor.

8th. We cordially invite all medical reformers in the United States to unite with us upon the platform . . .

9th. Upon these principles, as the basis of the science of medicine, as taught in the Eclectic Medical College of Pennsylvania, the society herein agrees to use all its influence to sustain said institution.

10th. We recognize all who stand upon this platform as true medical reformers.

In Witness Whereof, we, the committee representing the Middle States Reformed Medical Society, and the Eclectic Medical College of Pennsylvania respectively, this 18th day of May, 1854.

For the Middle State Reformed
Medical Society

John Palemon, M.D.
John S. Prettyman, M.D.
Wm. J. Williams, M.D.
Wm. Fields, M.D.
Wm. Armstrong, M.D.

For the Trustees and Faculty
of the Eclectic Medical
College of Pennsylvania

John Foney, M.D.
John Sites, M.D.
Henry Hollemback, M.D.

APPENDIX IV

(From *The Cincinnati Medical Recorder, Cincinnati,* 1883, *51,* No. 6, 97-8)

PLATFORM, CONSTITUTION AND BY-LAWS OF THE AMERICAN PHYSIO-MEDICAL ASSOCIATION

Platform of Principles

1. The Science of Medicine, like all other sciences, is based upon the laws of Nature; and Medical Art can be true and reliable only when it is in harmony with those laws.

2. Disease is that condition of bodily structures in which they are unable to perform their functions in a natural manner, which condition disturbs the harmony or equilibrium of the system; and the object of medical science is the restoration of diseased structures to their normal state, as far as possible, that they may be enabled again to perform their offices.

3. Physiological actions are always resistive to the causes of disease, and tend to the restoration of health when it is disturbed; and remedial treatment should harmonize with these physiological efforts, conserving and assisting the inherent curative powers of the system.

4. Observing this physiological standard as the only true guide in the Curative Art, no article should be used in the cure of disease that by its nature tends to damage the integrity of structures, or impair the vitality of tissues; hence all measures that are injurious, and all agents that are poisonous, are to be rejected from medical practice, as being in themselves causes of disease and not promoters of health.

Constitution

1. The name of this organization shall be THE AMERICAN ASSOCIATION OF PHYSIO-MEDICAL PHYSICIANS AND SURGEONS.

2. Among the objects of this Association shall be: (1) The promotion of the principles of Physio-Medical Science, as enunciated in the Platform of Principles adopted by this organization; (2) The enlightenment of public

sentiment upon these principles; (3) The encouragement of all measures that will advance professional education; (4) The mutual benefit of the members of this Association, and resistance to all unjust laws against Physio-Medical Science.

3. Members of this Association shall conform their sentiments and their practice to its Platform of Principles, and their professional life and conduct shall comport with the honor and dignity of this humane calling.

4. The officers of this Association shall consist of a President, two Vice-Presidents, a Secretary, and a Treasurer; to be elected annually, and to remain in office till their successors are chosen.

. . . .

7. The membership fee shall be two dollars a year, and thereafter such an amount as may be annually determined upon by the Executive Committee.

8. This Constitution may be altered or amended by a vote of two-thirds of the members present, at any regular meeting of the Association, one year's notice of the proposition to alter or amend having been publicly given to the Association.

By-Laws

1. A Board of Censors shall be appointed by the President, and confirmed by the Executive Committee, who shall examine all applicants for membership of this organization.

2. Gentlemen and ladies who are graduates of a medical college in good standing, or licentiates of a regularly organized Physio-Medical Society, or shall pass an examination before the Board of Censors, may become members of this Association by subscribing to its Constitution, agreeing therein to submit to its principles and by-laws.

3. Applicants for membership in this Association shall make application to the Board of Censors, accompanying the application with a fee of two dollars, and be recommended by two members of the Association.

4. The Board of Censors shall be guided in the examination of applicants for membership by the Platform of Principles, and shall take such measures as said Board may deem best calculated to elucidate facts bearing on the application, and shall present the conclusions arrived at to the Association; and pending the action of the Association any decision of the Censors shall stand as the decision of the Association.

. . .

6. This Association shall be divided into sections, as follows: Theory and Practice, Materia Medica, Surgery, Physiology, Obstetrics, Gynecology, Chemistry, Hygiene, Microscopy, Pathology, and Histology. The President of the Association shall appoint the Chairmen of the above committees on sciences, and these shall report at the next annual meeting.

7. All papers read before this Association shall belong to the Association.

. . .

The Boston Editions of Nicholas Culpeper

DAVID L. COWEN*

THE career of Nicholas Culpeper (1616-1654) is one of the most interesting and entertaining in the history of medicine. An apothecary's apprentice who became a popular London astrologer-physician, he is known to fame as a prolific medical writer and a carping antagonist of the Royal College of Physicians of London. His contemporary opponents publicly called him a drunkard and a lecher,[1] and medical history has classified him as a quacksalver.[2] His works, however, were frequently reprinted well into the nineteenth century[3] and even, indeed, into the present century, and as recently as nine years ago.[4] Rudyard Kipling has glorified Culpeper in story, poem, and speech[5] although, it might be added, he privately believed that Culpeper "couldn't cure for nuts."[6] A company of herbalists in England today calls itself the "Culpeper House,"[7] and recently Culpeper's name was used in the title of a historical novel of which he is the hero.[8]

Nicholas Culpeper has not, however, received his due as the putative author of what are perhaps the first two medical books published—long after his death—in the British North American colonies. It is the purpose of this paper to describe these books and indicate their place in medical history.

The first of these bore the following title-page:

> The English Physician, Containing, Admirable and Approved Remedies, for several of the most usual Diseases. Fitted to the meanest Capacity by N. Culpepper [*sic*], Doctor of Physick. Licensed, According to Order. Boston, Re-printed for Nicholas Boone, at the Sign of the Bible, near the Corner of School-House Lane. 1708.

* University College, Rutgers University, New Brunswick, New Jersey.

1 *Dictionary of national biography* (New York, 1908), vol. 5, p. 287.

2 F. H. Garrison, *An introduction to the history of medicine*, 4th ed. (Philadelphia, 1929), p. 289.

3 E.g., J. Scannon, *Culpeper's family herbal* (Exeter, N. H., 1824), and N. Culpeper, *The complete herbal* (London, 1828).

4 E.g., W. J. Ferrier, *Culpeper's English physician and complete herbal, arranged for use as a first aid herbal* (London, 1947).

5 The story was "A doctor of medicine," in *Rewards and fairies* (1910). See H. Cushing, *The life of Sir William Osler* (London, 1940), pp. 905, 927-928. The poem was "Our fathers of old," in *Rewards and fairies*. See W. H. Pollard, "Nicholas Culpeper—physician and astrologer," *Birmingham med. Rev.*, 1930, 5, 411-423. The speech was published as "The story of Nicholas Culpeper: astrologer-physician," *Lancet*, 1928, 2, 1061.

6 In a letter to Sir William Osler, May 10, 1914. Cushing, *op. cit.*, p. 1094.

7 With shops in London and Oxford, at least.

8 M. L. Tyrrell, *The affairs of Nicholas Culpeper* (Philadelphia, 1946).

This is a rare volume whose bibliographical significance was probably first recognized by James F. Ballard of the Boston Medical Library,[9] and the only known complete copy is at that library.[10] It is a very small (approximately 3″ x 5″) publication containing only 94 pages, and is probably to be classified as a "book" primarily because of its hard covers.

The work was obviously intended for the layman and presented what purported to be Culpeper's "choicest Secrets."[11] The arrangement was by ailments in alphabetical order, beginning with "Aches, and Lameness in the Body Joynts, Limbs and Bones," and proceeding through such items as "Bitings by Mad Dogs, Serpents, etc.," "Children's Infirmities," "Hickets," "Looseness and Costiveness," to "Liver and Lung Infirmities." The book ended there, by intent, for there is an imprinted "Finis."

The remedies were domestic and largely, though not entirely, herbal. Thus, for "Pains and Aches in the Back, Hip, Sides, or any part of the Body," one remedy was a concoction of Syrup of Poppy, Syrup of Betony, and Waters of Bugloss and Sage.[12] Another included the following directions: "Take the Gall of an Heifer for a Man; the Gall of a Steer for a Woman, Brandy, of each a like Quantity, boyl them together 'till it begin to be clammy, and before the Fire with a warm hand strongly bathe the Party Morning and Evenings, 'till he be whole."[13]

The prototype of this book was an item published in London in 1690 by Thomas Howkins under the title *Physical Receipts: or, the New English Physician*. On the title-page of this Culpeper's name is also misspelled and a license is gratuitously bestowed upon him. Moreover, it (and its American counterpart) did not resemble, in form or content, either the original *The English Physician* that was published in 1652, or the various editions of *The English Physician Enlarged* that followed. Nor did it resemble any, or any part of any, of the other works usually ascribed to Culpeper.

Indeed, all this, plus the abbreviated contents of the book, suggests that the work was more a tribute to the enterprise of publishers and to the fame of Culpeper, than a significant contribution

9 See Garrison, *op. cit.*, p. 375.

10 The only other copy, according to Mr. Ballard, is at the Kings County Medical Society of Brooklyn, N. Y. This copy lacks pp. 17-18.

11 In the note "To the Reader."

12 P. 3.

13 P. 4.

to medicine. (Unfortunately, the copy of the *Physical Receipts* in the British Museum, apparently the only known copy, is incomplete and contains considerably less than the Boston edition of 1708. Therefore it is not known whether the abrupt ending of the Boston edition followed the London edition or was Mr. Boone's personal contribution.)

The second American medical book, undoubtedly the work of Culpeper, was far more important. It was a reprint of his *Pharmacopoeia Londinenis or the London Dispensatory,* and was published by the same enterprising Nicholas Boone in Boston in 1720. This time, following the original, the title-page designated Dr. Culpeper, as "Gent. Student in Physick and Astrology."

This is a very significant book: not only was it the first full-length medical work published in the colonies,[14] but it was also the first work of a pharmacopoeial or dispensatory nature. Although it is true that Culpeper's *Pharmacopoeia* was an unauthorized translation, containing considerable gratuitous commentary, it nevertheless detracts from the claim to priority of the "Lititz Pharmacopoeia" (1778), and although it was hardly as elaborate or as comprehensive, it similarly detracts from the claim to priority of the *Edinburgh New Dispensatory* (Philadelphia, 1791).[15]

Since Culpeper's works had an "enormous sale" in England,[16] and probably also in the colonies[17] (the Boston 1720 edition is not rare[18]), the content of Culpeper's *Pharmacopoeia* is worthy of examination.

Culpeper's medical theory was heterogeneous to the point of being weird and obtuse. At the outset (in a note dated Jan. 2,

[14] The only known predecessors were the abbreviated 1708 Culpeper item discussed above, and Thomas Thacher's *Brief rule to guide the common people of New England how to order themselves and theirs in the small pocks or measles* (Boston, 1677), which has been described as "only a single sheet of paper" and a "mere tract." See Garrison, *op. cit.,* pp. 279, 375.

[15] Cf. D. L. Cowen, "The Edinburgh dispensatories," *The Papers of the Bibliographic Society of America,* 1951, *45,* 91. This author's statement, in his "Colonial laws pertaining to pharmacy," *J. Amer. pharm. Ass.,* 1934, *23,* 1239, that ". . . in 1736 no dispensatory or pharmacopoeia had yet been published in America," needs to be corrected.

[16] *D.N.B.,* vol. 5, p. 287. See note 59 below.

[17] E. Kremers and G. Urdang, *History of pharmacy,* 2d ed. (Philadelphia, 1951), p. 539.

[18] This writer knows of two copies of it in the Boston Medical Library, two at the New York Academy of Medicine, and one (or more) at the Armed Forces Medical Library, the Yale Medical Library, Bowdoin College, the American Antiquarian Society, Harvard College, The John Carter Brown Library, the Boston Public Library, and the Library of Congress.

1653) he informed the reader that "Sympathy and Antipathy are the two Hinges, upon which the whole Body of Physick turns."[19] But this suggestion of medical theory still to come was followed by "An Astrologo-Physical Discourse of the Humane Virtues in the Body of Man"[20] that was a hodge-podge of Hippocratic humoral medicine, Galenic classification, and Culpeperian astrology and pretensions of profundity. And again, in "A Premonitory Epistle to the Reader,"[21] after warning that "The Cause of Diseases is to be understood to be Natural,"[22] Culpeper proceeded, with a tortuous, scholastic kind of reasoning, to demonstrate the fact that the stars "have influence upon the Body of Man."[23] In all of this, however, he stated the underlying Galenic theory of disease which permeated the work: "All Diseases have their Original from superabundance or deficiency of Heat, Coldness, Dryness, or Moisture,"[24] and he concluded his book with a lengthy "Key to Galen and Hippocrates."[25] In fact, Culpeper's casuistry did not seemingly affect his *Pharmacopoeia* proper; even his astrology rarely showed through. His work was essentially the addition of commentary to, or the rearrangement of, the original, in accordance with the Galenic system.

Thus his "Catalogue of Simples"[26] classified roots as "hot" in four degrees, "temperate," "cold" in three degrees, "dry" in four degrees, and "moist." Then the roots were classified by the parts of the body they affected: those that heated the head, the neck and the throat, the stomach, the bowels, etc. Next they were classified by their "properties," e.g., those that mollified, glutinated, and purged.[27] Similar treatment was accorded the rest of the "Catalogue."

Perhaps the distinguishing feature of Culpeper's *Pharmacopoeia*, however, was its polemical undercurrent. Culpeper had reason to dislike the Royal College of Physicians whose *Pharmacopoeia* he had ventured to translate—reasons that were both professional and political. Culpeper was not a member of the Col-

19 N. Culpeper, *Pharmacopoeia Londinensis* (Boston, 1720), Preface.
20 *Ibid.*
21 *Ibid.*
22 *Ibid.*
23 *Ibid.*
24 *Ibid.*
25 *Ibid.*, pp. 271-308.
26 The work is arranged first in what is a rather faithful rendering of the "old" *Pharmacopoeia* (1618), with occasional commentary, and second in a translation and arrangement of the "new" *Pharmacopoeia* (1650). The "Catalogue of Simples" here referred to begins this second portion.
27 Boston, 1720 ed., pp. 53-55.

lege and was not authorized to make the translation.[28] Moreover, he had been on the Puritan-Parliamentary side during the Civil War, hardly the side of the *Royal* College. Thus, in September, 1649, after the publication of Culpeper's first translation (under the title *A Physicall Directory or a Translation of the London Dispensatory*), the royalist periodical *Mercurius Pragmaticus* let go a blast of vilification that is something of a classic of its kind. The *Pharmacopoeia,* the journal said, had been "done (very filthily) into English by one Nicholas Culpeper," who had been involved in "Independency, Brownisme, Anabaptisme," who had "admitted himself of John Goodwin's schoole," and who was later a "Seeker, Manifestarian . . . and now an absolute atheist." Moreover, he "by two yeeres drunken labour hath Gallimawfred the apothecaries book into nonsense, mixing every receipt therein with some scruples at least of rebellion or atheisme, besides the danger of poysoning men's bodies. And (to supply his drunkeness and leachery with a thirty shillings reward) endeavoured to bring into obloquy the famous societies of apothecaries and chyrurgeons."[29]

One of Culpeper's biographers, Sir Sidney Lee, has contended that the *translation* "had none of the defects here attributed to it."[30] Another has contended that Culpeper's work was "well-conceived and well carried out."[31] But, although in the first publication (1649) Culpeper did stay rather close to the original, he was certainly not the least sparing with his commentary. This he carefully differentiated from the College's material, but, adding insult to presumption, he was not above an occasional criticism. For example, at one point, he stated: "It is true that our Physitians have written the recept verbatim out of Gallen [*sic*] but me thinks they who boast they have taken so much pains in compiling this book, might have taken a little more to have corrected the Author's failings."[32]

In addition, although Culpeper included the College's original preface and its encomium of James I, his own preface was a revolu-

[28] At least once before and once later in the seventeenth century the College censured for unauthorized publication of its *Pharmacopoeia:* in 1639, John Mariot, printer of the *Pharmacopoeia,* and in 1688 the printer of Shipton's work on the *Pharmacopoeia.* See A. J. Horwood, "The manuscripts of the College of Physicians," in *Eighth report of the Royal Commission on Historical Manuscripts, report and appendix,* Part I (London, 1881), pp. 229-231. L. M. Payne, Assistant Librarian of the Royal College of Physicians, who knows the minutes of the College thoroughly, has informed the writer that Culpeper does not figure in them.

[29] *D.N.B.,* vol. 5, p. 286.

[30] *Ibid.*

[31] S. Pell, "Nicholas Culpeper," *Nineteenth century,* 1898, *43,* 761.

[32] *A physicall directory* (London, 1649), p. 96.

tionary document calling for "THE LIBERTY OF THE SUBJECT," and toasting the Commonwealth. In it he castigated the "Priests, Physitians, Lawyers" as those most responsible for the infringement of this liberty. The doctors he called "proud, insulting, domineering," and callous and greedy. The College, moreover, like the Papists who would not permit divinity to be printed in the vernacular, had kept physick secret and inaccessible. This last Culpeper set out to correct.

Culpeper's second edition of *A Physical Directory* (1650) was apparently prepared before the blistering attack on him appeared in the *Mercurius Pragmaticus*. In any case, although he was aware that some of the College were "already snarling at me," and although he again deplored the aura of arrogance and secrecy which the profession wrapped around itself, his more scathing comments were directed against "priests" rather than the College.[33]

The 1651 edition of *A Physical Directory* was quite different, however. In an "Epistle Dedicatory" directed "To the Colledge of Physitians," Culpeper pulled no punches. "All your skill in Physick might have been written in the inside of a Ring," he wrote. "Colledg, Colledg, thou are Diseased . . . the *Caus* is *Mammon* . . . The *Diagnosticks* are these. *Ipse dixit,* seven miles about *London,* Lay him in Prison: five pound a Month for practising Physick unless he be a Collegiate; Make a couple of Crutches of the *Apothecaries* and *Chyrurgions;* Be as proud as *Lucifer;* Ride in state with a *Foot-cloth;* Love the sight of *Angels; Cheat* the *Rich; Neglect* the *Poor;* Do nothing without *Money;* Be *self-conceited;* Be *Angry* . . ."

Undaunted, Culpeper proceeded to translate the revised edition of the London *Pharmacopoeia* that was issued by the College in 1650. And, emboldened by anger, or by his own failing health,[34] or by the tribulations of the Royal College under the Commonwealth,[35] he changed the name of his work to the *Pharmacopoeia Londinensis or the London Dispensatory*. First issued in 1653, the new work was offered to the laymen so that they "may cure themselves, and never be beholding to such Physitians as the iniquity of the Times affords."[36] It retained the translation of the Catalogue of Simples of the 1618 *Pharmacopoeia* and added the Catalogue of

[33] *A physical directory* (London, 1650), "To the Impartial Reader."

[34] Culpeper referred to his poor health in his prefatory writings. In the *Pharmacopoeia Londinensis* (London, 1653), for example, he spoke of himself as one "whose years are few." His illness, tuberculosis, is usually traced back to a chest wound received in the Civil War.

[35] See W. Munk, *The roll of the College of Physicians in London,* 2d ed. (London, 1878), vol. 3, pp. 322-323, 326.

[36] London, 1653 ed., p. 34; Boston, 1720 ed., p. 51.

Simples and the Preparations of the revised edition. The new material was accorded, in translation, a Galenic treatment and arrangement, and was interspersed with considerably more gratuitous commentary. At the end there was added "A key to Galen's Method of Physic."[37] The edition of the next year (1654), and those that followed, all advertised on their title-page that the work contained "Three Hundred Useful Additions." Altogether, the work's identity with the original Latin *Pharmacopoeia* was destroyed.

This was the background of the polemics, the witticisms and asides that abound in the Boston 1720 edition of Culpeper's *Pharmacopoeia Londinensis*. For, Culpeper having died in 1654, all the editions that followed were essentially the same as the 1653 edition. It is perhaps fitting that the first full-scale medical book printed in Purtan Massachusetts should have had a place in the religious, social, and political turmoil of the Puritan Revolution in England.

Thus, in the *Pharmacopoeia Londinensis* the phrase "spleen of a Roundhead" begins to take on meaning. "A lazy Gentry makes block headed Physitians," Culpeper commented at one point.[38] At another he accused the physicians of being unable to "write true Latin," and contended that they therefore "abbriviate their words by the middle, that so a man can neither tell what gender or what case they are of."[39] At still another point he accused the College of being "so misterious" and uncertain about a particular receipt, that it was impossible for him to give directions on how to make it.[40]

Moreover, Culpeper yielded to the temptation to comment bitingly whenever opportunity presented itself. Thus while the original Latin and his first translation of it in *A Physicall Directory* used succinct headings such as "Ligna," "Herba," or "Barks," "Herbs," etc., the later translations, after the title *A Physical Directory* was dropped, did not. Each heading presented a new opportunity that Culpeper could not forego, as the following examples indicate:

The BARKS which the Colledge blot paper with, are these that follow . . .[41]

To fill up another part of a page, the College quotes a few WOODS . . .[42]

The Herbs which the College spent so much pains and study, barely to name are . . .[43]

37 The posthumous editions (at least after 1667), including the Boston, 1720 edition, called this "A key to Galen and Hippocrates, their system of physick."

38 Boston, 1720 ed., p. 174.

39 *Ibid.*, p. 81.

40 *Ibid.*, p. 174.

41 *Ibid.*, p. 55.

42 *Ibid.*, p. 56.

43 *Ibid.*, p. 56.

Then the College will tell you a Tale, That there are such things in *Rerum Natura* as these Gums, *Rosins, Balsoms,* and *Juices* made thick . . .[44]

In the next place the College tells you a sowre tale concerning liquid *Juice* and *Tears* . . .[45]

Then the College tells you there are these things bred of PLANTS, and that every Child knows . . .[46]

Culpeper was at his best when he got to what the *Pharmacopoeia* called *Animalia Partes, Excrementa et Opera.* His list of "Parts of Living Creatures; Excrements," was prefaced with the following comment:

. . . lest any should think I go about to hide from them anything that might do them good, I have here inserted the living creatures and excrements &c. in the order the College left them. The use of the Fats and Suets you shall have, if you please but to stay till I come to the Oyles and Oyntments; the other which you think not useful for Physick, will serve to laugh at, the reading of them may make you merry, tho' the Smell of them might turn your stomach: My self cannot chuse but smile to think in what part of the Apothecaries Shop the College would have them kept, they had need place them nezt the Civet Pot.

And continued:

Therefore consider that the College give the Apothecaries a Catalogue of what *Parts of living Creatures and Excrements* they must keep in their shops. The *Fat, Greese* or *Suet of a Duck, Goose, Eel, Bore, Heron, Thymalos* (if you know where to get them), *Dog, Capon, Bever, wild Cat, Stork, Coney, Horse, Hedge Hog, Hen, Man, Lyon, Hart, Pike or* Jack (if they have any fat, I am perswaded 'tis worth twelve pence a grain), *Wolf, Mouse of the Mountains* (if you can catch them), *Pardal, Hog, Serpent, Badger, Gray or Brock, Fox, Vulture* (if you can catch 'em) . . .[47]

All this suggests that in his battle with the College, Culpeper might have consciously begun to develop an enlightened and critical spirit. Other statements might seem to lend some credence to this. He pointed out, for example, that he did not include all the Latin names in his translation—he rejected some as "Superfluous, some Ridiculous, some Idolatrous, . . . some Blasphemous." (Specifically he mentioned herbs attributed to or named after the Virgin Mary, St. Peter, St. Paul, The Holy Ghost, Allelujah, and Trinity; and Holy, Apostles, Divine, or Grace of God Plaisters.[48]) Of the Sambuci (Elder), he commented, "I know no wonders the Root will do,"[49] and of an electuary he stated that "you shall sooner hurt

[44] *Ibid.,* p. 69.
[45] *Ibid.,* p. 75.
[46] *Ibid.,* p. 75.
[47] *Ibid.,* pp. 76-77.
[48] *Ibid.,* In "The Translator's Preface."
[49] *Ibid.,* p. 12.

your purse by it than your body."[50] The Electuary of Mithridates and the Venice Treacle he labelled "terrible messes of altogether."[51] He even dared to challenge the highest authority: Galen and Dioscorides, he said, were "quite besides the cushion in saying that the Madder root was opening and cleansing."[52] In his preface he invoked "Dr. Reason" in opposition to "Dr. Tradition."

It is unfortunately true, however, that Culpeper's critical attitude in such matters was not thoroughgoing. His editorial insistence upon astrology, his occasional references within the *Pharmacopoeia* to planets, his slavish following of the Galenic system, hardly indicate that Culpeper was a rationalist. Although he held his nose at some of the animal products of the *Pharmacopoeia* he was not averse to recommending a dried and pulverized field mouse for diabetes,[53] and the ashes of Emmets, Ants or Pismires "To draw a Tooth without pain."[54] Moreover, he recommended "St. John's wort born about one" to keep "one from being hurt either by witches or devils,"[55] and that if anyone be bewitched, 'put some Quick Silver in a Quill stopt close, and lay it under the Threshold of the door."[56]

Obviously Culpeper was a product of his age, at odds with some of his contemporaries, but certainly not in advance of them. The indications of a critical attitude cited above may be no more than a sharpness of tongue, as Culpeper himself seemed to bear testimony. He concluded his work with the following revealing statement:

> I have now (Courteous Reader) led thee through the Colleges reformed and refined Dispensatory: I assure thee, not led thereto by any Envious *Principles* against them, for I bear them more good will, and love them better than they love themselves; only hate Selfishness in whomsoever I find it. If thou findest me here and there a little lavish in such expressions as may like not, I may ponder that, it is my Dialect, I *cannot* write without it; I assure thee it was not premeditated.[57]

Indeed, it might be said that one man's "scurilous railery"[58] is another man's *bon mot*.

50 *Ibid.*, p. 157.
51 *Ibid.*, p. 164.
52 *Ibid.*, p. 11.
53 *Ibid.*, p. 46.
54 London, 1683 ed., p. 48.
55 Boston, 1720 ed., p. 48.
56 *Ibid.*, p. 48.
57 *Ibid.*, p. 269.
58 Garrison, *op. cit.*, p. 289.

It must be remembered that Culpeper's *Pharmacopoeia* had undergone many printings in Great Britain[59] before it was reprinted in Boston in 1720. The popularity which the work seemed to enjoy, both in the mother country and in the colonies, was perhaps due to the obvious slant toward the household treatment of illness. It is significant in this connection that there are indications that the work became a housewife's handbook. A London edition of 1667, for example (in the Boston Medical Library), bears a fly-leaf notation that the book was given to Grace Greenleaf "by her honoured Mother . . . in the year 1764." The same book noted that Grace gave it to her sister Elizabeth two years later. A copy of the Boston edition of 1720 (in the same library) bears the notation, "Rachel Martin, Her Book, Given Her by Her Mother Jest before her Deth, March 13th Day 1765." Similarly, Mary Stott received a copy of the 1656 edition from her parson on July 12, 1700 (as noted in the copy in the Yale Medical Library). It is also worth noting, in passing, that Elizabeth received her copy just one year short of a century after it was printed, and that Rachel received hers 45 years after it was printed and 111 years after the death of its author.

In conclusion, it needs to be pointed out that the Boston 1720 edition was an inferior copy of Culpeper's work. One can forgive a frontier printing establishment for not having Greek type—the Boston edition omitted all the Greek insertions by which Culpeper had demonstrated, in the British editions, his classical training.[60] However, more serious defects are to be found: whole sections of the work are omitted,[61] and in one place there is the repetition of a whole section.[62] Finally, the Index is apparently that of the British edition from which it was copied (the Index to the *Simples* is the same as that of the London, 1679, and 1695 editions), and bears little relation to the pagination of the Boston edition.

It becomes obvious that printing, as well as physic, was in a parlous state.

[59] In 1649, 1650, 1651, 1653, 1654, 1655, 1656, 1658, 1659, 1667, 1672, 1679, 1683, 1695, 1702, 1718, at least.

[60] E.g., compare "Distilled water of centaury" in the London, 1683 ed., p. 89, with it in the Boston, 1720 ed., p. 86.

[61] On p. 46 (Boston, 1720 ed.) "Tears, liquors, and rosins" merge into "Parts of living things" with considerable material omitted; p. 82 shows an omission of a considerable amount of commentary and other material.

[62] P. 66 repeats p. 52.

Arabic Medicine in England*

D. M. DUNLOP†

THE subject of the present paper is a strictly limited aspect of Arabic medicine. In general, the time is now long past since conversance with Arabic medicine was part of the natural stock-in-trade, even the principal stock-in-trade, of the profession of medicine. With great advances in knowledge and certainly technique and all the various calls upon the time and energy of the physician or surgeon, it is only here and there that a man is to be found who has given more than the most cursory examination to what at one time was generally held to be practically indispensable. Even among historians of medicine the Arabic part of the past is largely relegated to the category of what is theoretically within the field but in fact may be left out of account. And in spite of growing attention to the past history of medicine this attitude tends not to alter but rather to harden with the passage of time, for the study of Arabic medicine is dependent almost exclusively on the Arabic texts themselves or the old black-letter Latin translations, and these do not become progressively easier to read. Indeed the opposite is rather the case, for the knowledge of Latin among doctors, in common with other classes of professional men, appears to be on the decline, so that the number of potential Arabist doctors, in the sense of medical men familiar with Arabic medicine in translation, becomes ever smaller. The desideratum for a report on Arabic medicine is clearly that the reporter should at once know Arabic—not merely good Latin—and medicine. In defect of such people, who in this country and elsewhere have at all times been few, recourse must be had to doctors who know Latin but not Arabic, or Arabists who lack medical knowledge.

One of the first points, if not actually the first, at which Arabic medicine appears in Europe is Salerno in south Italy. Here at Salerno was the famous medical school, the beginnings of which appear to go back to classical times, which enjoyed great celebrity in the Middle Ages, and was not finally closed till as late as 1811 under Napoleon. Salerno at least from the time of Constantine Africanus, the well-known translator or perhaps one should say mutilator of Arabic texts in the eleventh century, was important

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for the dissemination of the new ideas in medicine, and it is interesting that there should be a connection with England, apparently about this time, that is to say, right at the start of the movement. Sir Thomas Elyot, in his *Castel of Helthe*, first published in 1534, says[1]: "It semith that phisicke in this realme hathe ben well estemid, sens the hole studye of Salerno at the request of a kynge of Englande, wrate and set forth a compendious and profitable treatyse, called the Governaunce of helthe, in latyne *Regimen Sanitatis*." This statement is repeated by John Caius, M.D., second founder of Gonville and Caius College, in his tract *De antiquitate Cantebrigiensis academiae* which he published in 1574 or somewhat earlier. There Caius quotes the verse:

Anglorum regi scribit tota schola Salerni

from what he calls "an ancient parchment MS. of the *Flos medicinae*, written 268 years ago,"[2] i.e., approximately A.D. 1300. *Flos medicinae* is an alternative title for the *Regimen sanitatis*, and the work survives, with the verse quoted as first line.

The question then is, What king of England is here intended? This is indeed a good deal easier to ask than to answer. Neither Elyot nor Caius has mentioned any name or given further details, clearly because no details are given in the text of the *Regimen sanitatis*. Later writers, whose names I need not mention here,[3] produced arguments that Robert, Duke of Normandy, eldest son of William the Conqueror, was meant. Duke Robert appears to have passed through Salerno in 1098 on his way to the Holy Land, and the story is that there he received a wound in the arm from a poisoned arrow, which festered and could not be healed, so that the Duke was forced to return to his own country. Coming again to Salerno, he received advice from the famous school. His wound could not be cured except by sucking, but the Duke was unwilling that anyone should be exposed to the risk of death thereby. His wife Sibilla, however, daughter of the Duke of Conversana, sucked the wound while her husband was asleep, and so he was cured. The arrival of the Duke on this occasion is supposed to have coincided with news of the death in 1100 of his brother William Rufus, hence the doctors of Salerno addressed the *Regimen sanitatis* to

1 *Sir Thomas Elyot's Castel of helthe*, ed. S. A. Tannenbaum, New York, Scholars' Facsimiles and Reprints, 1937, Proheme or Preface (unpaginated).

2 J. Caius, *De antiquitate Cantebrigiensis academiae*, London, 1574, p. 132.

3 See the authors quoted by S. de Renzi, *Storia documentata della Scuola Medica di Salerno*, Naples, 1857, p. 267.

Robert with the title of King of England, and added to it a special section on the cure of a fistula.

De Renzi, the nineteenth century historian of the Salernitan school, went into the matter very thoroughly[4] and was not satisfied with the current explanation. He rightly considered that the latter part of the story appears legendary, and remarked, as several critics had already pointed out, that the cure of a fistula in the *Regimen sanitatis* says nothing about sucking the wound. De Renzi mentioned another interpretation, according to which the King of England is not Duke Robert, who was never in any case more than a pretender, but Edward the Confessor, who is said to have approached the Salernitan doctors some time before 1065 for a cure of the maladies which afflicted him, a situation much more in accordance with the actual contents of the *Regimen sanitatis.* This explanation, however, is unsupported by known facts, and since there are other texts of the work where instead of

Anglorum regi scribit tota schola Salerni

one finds

Roberto regi scribit tota schola Salerni

or

Francorum regi etc.,

De Renzi regarded it as most probable that the school at different times sent out their *Regimen* in somewhat different form to various princes and sovereigns.

Yet another explanation has recently been advanced by René Verrier, following Sudhoff, viz., that the *Regimen sanitatis* was actually written by Arnold of Villanova about 1300, and that the reference to a king of England is a mere flourish without any factual reference.[5] Yet the solutions offered by De Renzi and Verrier, which obviously cannot both be right, appear equally conjectural and speculative. The legend of the cure of the Duke's fistula need not be accepted, yet on the whole we seem to be on more solid ground with what may be called the 'received' opinion. Duke Robert is credibly stated to have been greeted in Italy on the death of Rufus as King of England,[6] and further, as we have seen, he is actually named in one form of the verse. We have therefore what appears to be a genuine contact between England and the school of Salerno at this time, 1100.

4 *Op. cit.*, pp. 266-279.
5 *Études sur Arnaud de Villeneuve*, III (Leiden, 1949), p. 68.
6 *Encyclopaedia Britannica*, 11th ed., art. Robert II of Normandy.

Granted so much, we must not indeed assume that from this date Arabic medicine began to make immediate headway in England. As yet only Constantine Africanus, of the great translators from Arabic, had made his appearance. The work of others, Gerard of Cremona, Stephen of Antioch, Mark of Toledo, and Faraj b. Sālim, came later. There is clearly a considerable difference between the *Regimen sanitatis* and works of definite Arabist character, and by the same token a gap in time between its appearance and the entry of Arabic medicine. The authorities of the *Regimen*, so far as they are mentioned at all (in the long version of the text given by De Renzi, Galen, Asclepias, Pliny, Copho of Salerno, and Hippocrates) are not Arabic.[7] The case is very different with such writers as Gilbertus Anglicus (*circa* 1290), author of a *Compendium medicinae*, which contains whole chapters transcribed word for word from Rhazes,[8] and John of Gaddesden, who flourished *circa* 1320 and compiled the once celebrated *Rosa Anglica*. Similarly, the English surgeon John Arderne, who was in Newark when the plague broke out in 1349,[9] transcribed from Albucasis. The definitive introduction of Arabist medicine must therefore be placed, it seems, some time between 1100 and 1290. We shall not attempt to define the date more exactly, but a pointer to the extent to which it subsequently came to dominate the medical scene in England is given by Richard of Bury in the *Philobiblon*, a work written shortly before his death in 1345. There the typical medical books, as typical as the *Pandects* for the study of law, are two in number, the *Tegni*, i.e., the *Mikrē Tekhnē* of pseudo-Galen, translated from Arabic into Latin by Constantine Africanus, and the *Canon* of Avicenna.[10]

Rather than repeat what may readily be found elsewhere, it seems desirable to take one of the less known doctors of this age, Magister Henricus Anglicus, Henry the Englishman, and give information about him. Henry the Englishman cut quite a figure at the court of Charles I of Anjou, king of Naples, towards the close of the thirteenth century.[11] He is mentioned in the *Breviarium practicae*, usually ascribed to Arnold of Villanova, together with other British doctors, Michael Scotus, a certain Hibernicus, and a Magister Hector Anglicus, who may be the same person. The

[7] In the text of the *Flos medicinae* = *Regimen sanitatis* given by De Renzi (? later than 1100) "Alchalcolon" and "Trifera Saracenica" suggest Arabic influence (*Collectio Salernitana*, I [Naples, 1852], pp. 473 and 481).

[8] J. Freind, *The history of physick*, etc., II (London 1726), p. 268.

[9] Freind, *Ibid.*, 325.

[10] Richard of Bury, *Philobiblon* in *A Miscellany*, ed. H. Morley (London 1888), p. 54.

[11] Cf. R. Verrier, *op. cit.*, p. 30.

Arabist leanings of Arnold of Villanova are well known and are reflected in his choice of authorities. As a specimen of Michael Scot's remedies, we may take the following technique of anaesthesis.[12]

To induce sleep strongly, take good Egyptian opium, rind of mandragora, with henbane-root in the proportion of three to one. Triturate, shake with cold water and allow to settle. Now if you wish to saw or cut the patient open without his feeling pain, place a piece of linen in the liquid, and moisten his brow from ear to ear and at the same time the nostrils. The patient will immediately sleep, and you will be able to do as you please. When you wish to revive him, dip a cloth in strong vinegar, place it upon his nostrils, and he will at once awaken. This is of great value in cases of phrenesis [mania], when it is necessary that the patient should sleep.

The practice of Henry the Englishman, so far as it is recorded by the author of the *Breviarium,* shows nothing so drastic as this, but he too evidently had ideas of his own. On scrofula the author of the *Breviarium* writes[13]:

Another attested remedy for this complaint is to take a mole [*talpa*] and seethe it well. Then dry it in the sun, pulverize, and extract the powder through a hair-sieve. Mix with honey, etc., and make pills the size of chick-peas. Administer 3 to 5 in whey every day, until the matter of the scrofula is separated and carried off. Henry the Englishman swore to me that he had made trial of this remedy a number of times. [Again for scrofula[14]], another remedy attested by Magister Henricus Anglicus is the following ointment. Take horse-radish, pellitory and juice of horehound. Beat all together, add a sufficient amount of wax, and with a little oil make an ointment, to be applied before a fire. Immediately thereafter apply the following plaster. Take a squill, root of laurel, serpentaria or snakeweed, and sow-bread[15] [*cyclamen europaeum*] and beat up with lard. Apply hot. An attested remedy.

Or consider the following, for a quartan fever.[16]

An attested ointment for any quartan, true as well as false. And Magister Hector [read probably Henricus] Anglicus swore to me that he had cured any number of persons suffering from quartan fevers by means of it. Take juice of southernwood, juice of rue and artemisia in the proportion of three to one; common oil, three parts to two; and oil of laurel, three parts to one. Boil the ingredients together over a slow fire; add a little pulverized frankincense, three parts to a third; and again boil, till evaporation is complete. Then add three parts to one . . . of fresh liquid wax, and make an ointment. With this, one hour before the access of the fever, between two fires, anoint the reins and back to the coccyx, the legs, spleen, navel, belly, the palm of the left hand and sole of the left foot, pulse, and temples. Then

12 *Breviarium practicae* (Lyons, 1532), IV, c. 10.
13 *Ibid.*, II, c. 5.
14 *Ibid.*
15 I owe the identification of "panis porcinus" to Mr. E. Robinson, Pembroke College, Cambridge.
16 *Brev. prac.*, IV, c. 27.

place the patient in bed immediately and cover well, administering some of the above-mentioned juices in a drink of fragrant wine. Repeat several times, because in a short time the quartan will be relieved, especially where previously has been a general purge.

Or again,[17]

for a continuous quartan, Another plaster which I have frequently made trial of, if placed upon the belly, quickly loosens the bowels; if on the stomach, induces vomiting; if on the reins, induces micturition; and if placed on the pecten, brings forth a woman's dead child. But see that it is at once removed when the effect is produced, because it may be too powerful. Magister Henricus Anglicus, while at Naples, said to me that in all these cases he had made trial of this plaster, and never went anywhere without it.

And another recipe follows.

The remedies or curative techniques which have just been cited are not explicitly given in the *Breviarium practicae* as from Arabic authors, and the case is a little different from that of Gilbertus Anglicus, already referred to, who quotes from Isaac Israeli and Avicenna[18] as well as Rhazes. But it is virtually certain that Magister Henricus also studied Arabist texts, especially since in fact we find him assisting at the production of one of the most important of these, the *Continens* of Rhazes. Surviving records of the court of Naples[19] show that Charles I of Anjou interested himself in the translation of Arabic medical works into Latin and had indeed a complete establishment for this purpose, including actual translators from the Arabic, such as Faraj b. Sālim (Farragut) and Moses of Salerno, copyists (*scriptores*) and correctors. It was to the last category that Henry the Englishman belonged, and he is mentioned in a letter of King Charles, dated 1281,[20] as in receipt of a regular salary. "*Vobis mandamus quod Johanni de Paganis, Nicolao de Messay et Magistro Henrico Anglico, quos nos statuimus pro collatione ipsa facienda, exhibeatur eorum salarium pro toto tempore quo in eodem servitio continue morabuntur, ad rationem de duodecim granis per diem pro quolibet.*" The work in question was the *Continens* of Rhazes, which appears in several letters of the king under its Arabic title *al-Hāwī* (*elhaui*), i.e., the Comprehensive (Book), hence *Continens*. It had evidently now been translated, or was in process of translation, by Faraj b. Sālim, and copies were being produced. We have probably to understand that the business of Henry the Englishman was with the Latin,

[17] *Ibid.*, IV, c. 31.

[18] D. Campbell, *Arabian medicine*, I (London 1926), p. 163.

[19] G. del Giudice, *Codice diplomatico del regno di Carlo I*, etc. (Naples 1869 and later), II, ii, 171-179.

[20] *Ibid.*, pp. 174-175nn.

rather than the Arabic text, and he may have checked the copies as a medical expert. In any case, his services were remunerated slightly less well than those of the *scriptores,* who received a salary of 15 *grani* a day.[21]

Apart from the *Continens* of Rhazes, another important Arabist work was produced at this time and place, viz., the *Tacuin* of Ibn Jazlah, so-called from the first part of the original title in Arabic *Taqwīm al-Abdān,* or the Ordering of Bodies, distinct from the *Tacuin sanitatis* (the Ordering of Health) of Ibn Butlān, *Arabice Taqwīm aṣ-Ṣiḥḥah.* A letter of Charles dated 1280 speaks of the former, i.e., the *Tacuin* of Ibn Jazlah, as having been lately translated by the Jew Faraj, though it is often ascribed to Moses of Palermo. The part of Henry the Englishman, if any, in this production is not, it seems, recorded.[22]

For the last century and a half of the mediaeval period, i.e., approximately 1350 to 1500, there is little precise evidence of Arabic or rather Arabist medicine in this country. But it may be taken that Arabist works continued to be read by the faculty. With the invention of printing the multiplication and dissemination of books became possible on a larger scale than ever before. It is remarkable how many of the first productions of the printing-press in Europe were works of Arabist medicine. Thus of nine Latin editions of Mesue (Māsawaih) in the British Museum, five are dated before 1500.[23] The *Isagoge* (otherwise *Liber introductionis in medicinam*) of Joannitius (sc. Ḥunain b. Isḥāq) was printed at Leipzig in 1497. The *Tractatus de oculis* of Jesu Haly (properly ʿAlī b. ʿIsā) was printed in 1497 and again in 1499 and 1500. The *Nonus Almansoris,* i.e., the 9th Book of the *Kitāb al-Mansūrī* of Rhazes, was printed with the rest of that work at Milan, 1481, and Venice, 1497, and separately at Venice, 1483, 1490, 1493, and 1497, and Padua, 1480.[24] The tale might be extended to practically the whole corpus of Arabist medicine.

It follows of course from this that in the period immediately before the invention of printing these books were highly esteemed, and the effect of the multiplication of copies must have been their reaching far wider circles than ever before. The contrast between the flood of Arabist medical works now flowing from the presses and the situation in 1395 when nine volumes composed the whole

21 *Ibid.*
22 *Ibid.,* 175n., cf. 178n.
23 Campbell, *op. cit.,* I, p. 60.
24 Details from Campbell, *op. cit.*

library of the medical faculty of Paris[25] is striking indeed. It might thus seem not too much to say that the heyday of Arabist medical influence lies in the interval between the invention of printing and the gradual abandonment of Arabic authority, as enthusiasm for Greek developed and the Greek medical sources became known.

Confirmation for the view that Arabist influence was strong before and immediately after the invention of printing is forthcoming from English medical writers of the sixteenth century, though it has to be noted that of all the extremely numerous printed editions of Arabist works which appeared at this time and later, indeed so long as Arabic medicine was seriously followed by the leading practitioners, not one, it seems, was published in England. This point will be referred to again later.

We have already spoken of Sir Thomas Elyot's *Castel of Helthe*. This is a popular work, and its author, a lawyer and busy man of affairs, presumably does not represent the most advanced scientific opinion of the time when his book was written (*circa* 1534). The *Castel of Helthe* may in fact be regarded as a mediaeval work, and the difference of point of view between it and certain other English works in the same century is striking. Yet Elyot's book is calculated to give a good impression of ordinary opinion in England in his own day, and to judge by its success (16 eds. to 1610), for a long time to come. The following extracts from the preface[26] indicate the place which Arabic authors had come to enjoy in popular esteem, though it may be observed that in the work itself they are inconspicuous. "Besides the said kings whome I have rehersed," says Elyot, quite in the mediaeval style, "other honorable personages have written in this excellent doctrine [*sc.* the 'scyence of physicke'], and not only of the speculative part, but also of the practyse therof: whose warkes doo yet remayne unto their glory immortall, as Avicenna, Abensoar, Rasis, etc." He goes on a little further down:

> But yet one thynge moche griuyth me that notwithstanding I have ever honoured and specyally favorid the reverend college of approuid phisitions, yet some of them hearyng me spoken of, haue said in derision that all though I were pretily seene in hystories, yet being not lernyd in phisicke I haue putte in my boke dyuerse errours, in presumynge to wryte of herbes and medicines. . . . Whan I wrate fyrste this boke I was not all ignorante in phisyke, fore before that I was xx yeres olde, a worshipfull phisition and one of the most renounced at that tyme in England, percyuyng me by nature inclined to knowledge, rad unto me the workes of Galene of temperamentes,

[25] E. T. Withington, *Medical history* (London, 1894), p. 146, without mention of source.

[26] *Op. cit.*, Proheme.

natural faculties, the *Introduction* of Johanicius, with some of the *Aphorysmes* of Hippocrates. And afterwards by mine owne study I rade over in order the more part of the warkes of Hyppocrates, Galenus, Oribasius, Paulus Celius (?), Alexander Trallianus, Celsus, Plinius, the one and the other (though it is perhaps a little difficult to see what help the younger Pliny, author of ten books of *Letters* and a *Panegyricus* in honour of Trajan, has to offer the student of medicine) with Diascorides. Nor I dyd omit to reade the longe *Canones* of Auicenna, the *Commentaries* of Auerrois, the *Praktikis* of Isake, Halyabbas, Rasys, Mesue, and also of the more part of them which were their aggregatours and followers, and all though I haue neuer ben at Montpellier, Padua nor Salern, yet haue I found some thynge in phisycke, whereby I haue taken no little profyte concernynge myne owne helthe.

Elyot speaks here indeed as if most Arabic authorities were something of a work of supererogation, but at all events, he says, he did read them. Of the works he mentions there were without exception, it appears, editions already available, printed mostly in Italy.

At this point we take leave of Arabic medicine in England for a considerable period of time, at least until the classical enthusiasm of the Renaissance had abated. While Elyot was preparing himself to produce the *Castel of Helthe* or engaged in his public duties, Thomas Linacre (1480-1524), his older contemporary, was engaged on a new Latin translation of Galen from Greek. A little later Vesalius (1514-1564) began to pursue his anatomical investigations. It was in these directions that medical studies were destined to advance in the century of the high Renaissance. Towards the end of the century one looks in vain for traces of Arabism in the writings of John Caius (1510-1573). It might be expected that Caius, the leading English physician of his time (president of the College of Physicians for many years and medical attendant to three sovereigns, Edward VI, Mary, and Elizabeth), when he came to write about the history of his own University of Cambridge, would have had something to say about the Arabist past in medicine. But neither in the *De antiquitate Cantebrigensis academiae* (London 1574), nor in his account of his writings *De libris propriis* (London 1570) does he appear to betray any interest in the subject. Caius and most of his medical contemporaries rode on the full tide of classicism.

It was much the same situation in the following century, the seventeenth, though now modern medicine began to emerge with an identity of its own. Arabist works, notably Avicenna's *Canon of Medicine* (*Qānūn fī' ṭ-Ṭibb*), continued to be reprinted. Arabist doctors still based a considerable amount of their theory and prac-

tice on the old authorities, and in some cases were in a position to consult the Arabic originals, e.g., Plemp of Louvain, Deusing of Groningen, and Welsch of Augsburg. This was on the Continent. English medicine, on the other hand, in the person of men like Harvey (1578-1657) and Sydenham (1624-1689) proceeded steadily along the newer course with notable success.

With the coming of the eighteenth century a change sets in, so far as Arabic medicine in this country is concerned, and what is virtually a new era begins. Driven out from the schools and the sphere of practical medicine, first by the recently discovered or rediscovered Greek medical texts, then by the new experimental teaching, the Arabist doctrines returned, not indeed to their former dominating position but at least to respectability, in an unforeseen way. The hostility to Arabic medicine which had been displayed in leading medical circles for a long time, at least a century and a half (roughly 1550 to 1700), began to give place, when the battle against traditionalism had been won, to an attitude of curiosity. So far as we are concerned here, this new attitude comes to light for the first time in the *History of Physick* of John Freind, M.D., first published in 1725,[27] and has continued, it may be said, to the present day. Since Freind's time the place of Arabic medicine among us has been secure, not indeed in practice nor in medical theory, but in that important part of medical studies of which Freind was virtually the founder in this country, viz., the history of medicine.

Before going on to characterize Freind's work and the work of those who are to a great extent his pupils and followers, it seems pertinent to cast an eye back over the Arabic past in England up to his time to see if any general conclusions may be reached. The whole course of English medicine from 1150, to take a round figure, to about 1550 was profoundly influenced by the Arabs in their Latin dress. What is somewhat remarkable is that in this long period of four hundred years there is no evidence of a single English doctor who translated or even read Arabic in the original, though there were certainly Englishmen active in other fields who did so, Adelard of Bath before 1150, Robert Retinensis or of Chester, and others, not to mention the reputed wizard Michael Scot. The case is different on the Continent, where a number of well-known medical practitioners, Arnold of Villanova, Peter of Abano, Matthew Sylvaticus, etc., appear to have known Arabic, as

[27] Vol. II, containing accounts of the Arabic authors, came out in the following year.

did certainly Andreas Alpagus, the improver of Avicenna, later, and the physicians Plemp, Welsch and Deusing already mentioned. This circumstance is interesting when taken in conjunction with the fact that up to the time which we have reached, no single Latin translation of an Arabic text appears to have come from the English presses. Campbell in his *Arabian Medicine* seems to speak of a *Rasis Opera* published in London, 1747, which, if it existed, would be apparently the solitary exception, but see below.[28]

The reason for the absence of English Arabist printed works is not, I am sure, due to any inherent antipathy of our countrymen to Arabic medicine, since they appear to have used Arabist works for centuries, nor even their alleged solid practical sense, which might be thought to have prevented them from being led away by the sometimes dubious light shed upon medicine by the Arab doctors. The reason for this situation is rather to be sought in the cultural position of England at the time when the Arabist works were being printed most assiduously, viz., the late fifteenth and early sixteenth centuries, lagging somewhat behind Italy and perhaps other European countries in cultural matters, including medicine. When the leeway began to be made up, the Arabists were already beginning to be discredited. In any case, theorizing apart, the facts seem to be as stated: no English doctor who translated or read Arabic, and, later, no English Arabist publications. In both these respects the situation was to be different after the time of Freind.

Freind's *History of Physick* appears to have been first sent in the form of a long letter or discourse, as the author calls it, dated 10 May 1723, to Dr. Richard Mead (1673-1754), after the death of John Radcliffe in 1714 the acknowledged head of the English medical profession. As published in 1725, the work is in two volumes, of which the first is devoted entirely to the ancient Greeks. The second volume begins with the Arabians, as Freind calls them, who get somewhat more space (218 pages) than the moderns up to A.D. 1600 (197 pages). Of the whole work nearly a third (218 out of a total of 727 pages) is given to Arabic medicine. Freind at least cannot be charged with the contempt for this branch which was felt during the Renaissance. It may indeed be thought that he assigns too large a place to the Arabic doctors, but at all events the impression left by his work is that he knew what he was talking about. After some general remarks he begins with Haly Abbas (ʿAli b. al-ʿAbbās al-Majūsī) who, he says, gives us "the oldest as

[28] I, p. 70.

well as the fullest and best account we have of the ancient Arabian physick."[29] Following this account at the beginning of the *Liber Regius* (*al-Kitāb al-Malikī*), Freind speaks shortly of Aaron, Mesue, Serapion, and then at greater length of Rhazes (pp. 43-69), the last of the great Arabic doctors mentioned by Haly Abbas. Freind gives a tabular analysis of the ten books *Ad Almansorem* (al-Manṣūrī) of Rhazes, showing the extent of its dependence on the Greek doctors, yet he finds it superior to the other main work of Rhazes, which we have already noticed—the huge compilation called the *Continens*. Of Haly Abbas himself he does not say much, but remarks of the *Liber Regius* "if one would choose an Arabicke system of physicke, that of Haly seems to be less confused and more intelligible, as well as more consistent, than [the *Canon*] of Avicenna."[30] The merits of Haly Abbas are put less equivocally by Campbell: "*Al-Malikī* is generally regarded as the best work of the Arabic Period."[31] If the *Liber Regius* is now regarded in the West as superior to Avicenna's *Canon of Medicine*, it certainly was not always so. The source of the judgment is probably Freind.

Of Avicenna his account is short (69-74). On the other hand, he speaks at length (pp. 74-114) of Avenzoar, author of the *Theisir* (at-Taisīr, Facilitation), remarking that Avenzoar is "much less known to our moderns than the rest of the Arabians." The grounds for this last observation I do not know. Certainly there had been a number of printed editions of the Latin translation made in 1280 by Paravicius. Of this work Freind says "The translation indeed of [Avenzoar] as well as of all the Arabian writers is very barbarous [i.e., non-classical]: but if he were put into a good dress, in any language whatever, he might perhaps please the taste even of the present age."[32]

Freind deals briefly with Averroes (pp. 115-123) of whom he supposes that "he does not seem to have been much conversant in practice," which of course is entirely right, since Averroes was jurist and philosopher rather than medical man. He then passes to Albucasis (Abū'l-Qāsim az-Zahrāwī), with whom he deals at length (pp. 123-187), as the greatest expert in surgery among the Arabs,

[29] *Op. cit.*, II, p. 36. An English translation *in extenso* is given by A. A. Khairallah, *Outline of Arabic contributions to medicine*, Beirut, 1946, pp. 112-115.

[30] The author of the well-known historical work *al-Fakhrī* (written in Arabic in A.D. 1302), speaking of Avicenna's *Canon of medicine*, says that it was full of obscure expressions and difficult to understand, and that therefore the majority of doctors preferred the *Kitāb al-Malikī* (ed. Derenbourg, Paris, 1895, p. 17). The father of the celebrated Avenzoar, also a doctor, had a low opinion of Avicenna's *Canon* (G. Colin, *Avenzoar, sa vie et ses oeuvres*, Paris, 1911, p. 17).

[31] *Op. cit.*, I, p. 75.

[32] *Op. cit.*, II, p. 114.

and closes with an appreciation of Rhazes on smallpox (187 *ff.*).

What is apparent in this fairly comprehensive account of the Arabic doctors is Freind's real knowledge of the works he is describing. Historical circumstances occasionally elude him, but he has a distinct appreciation of each man's place and is able to give him a complete medical character. The reason is simple and obvious: Freind had really read the Arabist Latin works and knew what they contained. Since his time Freind scarcely has had a rival. It is not to be wondered at that his opinions influenced his successors, as we shall yet see more distinctly.

Freind knew no Arabic, his special department being the Latin versions. His correspondent was also without Arabic. Yet it is interesting to find Dr. Mead pushing enquiries among his acquaintance about an Arabic author whom Freind calls Abi Osbaia, i.e., Ibn abī Uṣaibi 'ah, author of the *Ṭabaqāt al-Aṭibbā'* (Classes of the Doctors), which was published in the nineteenth century and is a great source of information for Arabic medicine of most periods (the author died in 1270). Freind mentions a transcript of the work as in Mead's possession. "You, Sir," he writes,[33] "very generously, in your usual manner, at your own expence, procured a copy of the Arabicke original and a translation of several of these lives," *sc.* which Ibn abī Uṣaibi 'ah contains. It is one of these which Freind gives, translated by Salomon Negri of Damascus, as his first appendix. He does not add that, some time later apparently, Salomon Negri completed a translation of Ibn abī Uṣaibi 'ah in Latin, evidently under the same auspices. This passed into the hands of Dr. William Hunter later in the eighteenth century and is now among his medical treasures in Glasgow University.[34]

Freind speaks in one place of the work of Rhazes *On Smallpox* as the best example of Arabic medical writing.[35] This remark seems undoubtedly to have shaped later developments. In 1747, many years after Freind's death, Mead brought out, as a supplement to a work of his own on the same subject, the *De variolis et morbillis*, sometimes, especially earlier, known as the *De pestilentia*, of Rhazes.[36] Instead of utilizing any older translation he had a transcript of the Arabic original made in Leiden, where there happened to be a MS. and requested Salomon Negri and John Gagnier,

[33] *Ibid.*, II, p. 35.

[34] G.S.A. Ranking, "The life and work of Rhazes," *Proc. XVIIth int. Congr. Med.*, London, 1913, Sect. xxiii (History of Medicine), p. 237.

[35] *Op. cit.*, II, p. 216.

[36] *De variolis et morbillis liber, auctore Richardo Mead. Huic accessit Rhazis . . . de iisdem morbis commentarius*, London, 1747.

both of whom are mentioned by Freind, to make a Latin version. This they did independently, but Mead, finding inconsistencies in the two translations, handed them with the transcript to Thomas Hunt, with an invitation to produce a revised version.[37] Hunt, a theologian, probably did not know much about medicine, and the transcript is said to have been a poor one, but in any case, in this somewhat haphazard way, a version deemed satisfactory was produced and duly printed by Mead.

This version, so far as I have been able to ascertain, was the first Latin rendering of an Arabic medical text to appear in England. As already mentioned, it was published in 1747 and seems to be the sole basis for the suggestion that *Rasis Opera* appeared in London in that year.[38] In another twenty years it was followed by another, by John Channing, described on his title-page as a native and citizen of London, who in 1766 produced Rhazes' *De variolis et morbillis* in both Latin and Arabic and, he adds, at his own expense.[39]

The circumstances of Channing are not altogether easy to make out. His book is dedicated *"viro nobili, spectatissimo eruditissimoque Carolo Yorke, patris praeclari filio praeclaro."* This is evidently the Hon. Charles Yorke, (1722-1770), second son of the first Earl of Hardwicke. He was appointed Lord Chancellor in unusual circumstances and lived for only a few days afterwards. Yorke had assisted Channing to procure for his edition a copy of the same Leiden MS. that had been used previously for Mead's edition of 1747. His college was Corpus Christi, Cambridge,[40] and it is possible that Channing, too, was a Cambridge man, though he says nothing about it and mentions no degrees, medical or otherwise, which he may have held. He is not listed in the Cambridge records, so far as I have been able to see, nor in the *Dictionary of National Biography*.

A "John Channing, son of John, of Essex Street, London, gent., Wadham College, matriculated 14 Jan., 1764 aged seventeen, Christ Church, B.A. 1767, M.A., 1770" is mentioned.[41] But this

[37] *Ibid.*, Praefatio, p. xii.

[38] Cf. n. 28. Campbell says (*op. cit.*, I, p. 70) that a Latin edition of the *De variolis et morbillis* of Rhazes appeared in London, 1747 (i.e., Mead's book) and Göttingen, 1781. (He says, *Ibid.*, p. 71, that the *De variolis et morbillis* appeared in London, 1749—doubtless an error.) He repeats the data "London, 1747 and Göttingen, 1781," after listing various Latin versions of the complete works of Rhazes. But no such work as *Rasis (Rhazis) Opera*, London 1747, is known.

[39] *Rhazes de variolis et morbillis, Arabice et Latine, cum aliis eiusdem argumenti, cura et impensis Johannis Channing, natu et civitate Londinensis*, London 1766.

[40] *Encyclopaedia Britannica*, art. Charles Yorke.

[41] *Alumni Oxonienses, 1715-1886*, I, p. 238.

can scarcely be the author of the edition of Rhazes, not merely from the dates, which make it difficult, but from Channing's statement in his preface that he was a stranger (*inquilinus*) in Oxford. We must therefore regard his personality as something of a mystery.

Of the method of translation which he adopted, Channing writes[42]: "The version agrees in sense, as you will readily see from reading, with the translation appended to his own little book *De variolis et morbillis* by the celebrated Dr. Mead, which translation was made from a very incorrect copy, at Mead's request, by my dear friend, the Reverend Thomas Hunt, S.T.P., Canon of Christ Church, Oxford, whose friendship I count among the special happinesses of my life." One notices that Channing here makes no reference to the part played by Salomon Negri and Gangier in producing the earlier translation. One notices, too, that Hunt was a Canon of Christ Church. It therefore seems just possible that Channing is in fact the Christ Church graduate already mentioned, and that as a very mature undergraduate of eighteen or nineteen he produced the work which is before us.

It would be unduly tedious to quote samples of the two translations, of which in general one may say that Hunt's reads better, while Channing's is closer to the text. But it may be worth remarking that Channing adopts the expedient, in the case of words for which there was no exact equivalent in Latin or no exact equivalent known to him, of leaving the Arabic word untranslated in the Latin translation. This is exactly the practice of the mediaeval Latin translators and was one of the principal counts in the charge of barbarism levelled against them at the time of the Renaissance.

As to Channing's Arabic text, it is moderately good, but definitely below the standard which would be expected in a critical edition of an Arabic author nowadays. At the end of his preface Channing tells us that if he feels that his work has been well received, he intends shortly to publish the work of Albucasis on surgery from two Bodleian MSS., which at that time he had apparently already copied out. In due course, but not until 1778, *Albucasis, De Chirurgia* in Latin and Arabic by J. Channing did make its appearance at the Clarendon Press, Oxford. The work is rare. It is not, e.g., in the Cambridge University Library, and I have not seen it. Ultimately, in 1781, a second edition of Channing's Rhazes was called for.[43]

42 *Op. cit.*, p. viii.
43 Mentioned in the British Museum Catalogue.

The works of Rhazes and Albucasis edited by Channing are, so far as is known, the first Arabic medical texts ever printed in England. We may be nearly certain that the source of Channing's unusual interest in these texts was, like Mead's, Freind. The two works of Arabic medicine which Channing selected for publication had received special attention from Freind, and the two Bodleian MSS. of Albucasis which Channing promises to use in his Rhazes, and doubtless did use, are mentioned distinctly and even partially described by Freind, who had asked Gagnier to look at them for him.[44] From them Freind established the identity of Albucasis and Alsaharavius (az-Zahrāwī, i.e., belonging to the pleasure-city of az-Zahrā' near Cordova built by the Umayyad Caliph an-Nāṣir), and it is not by chance that the double naming appears again in Channing.

We must take leave of Channing, and passing over Dr. William Hunter already mentioned, whose Arabic interest has been demonstrated recently by H. G. Farmer,[45] we come to another medical man, D. M. Moir, who received his professional education at Edinburgh and practised successfully in the town of Musselburgh. In 1831[46] Moir published a work which he called *Outlines of the Ancient History of Medicine,* and in which he devotes rather more than sixty pages to the Arabic doctors. As he says in his preface, he is "boundlessly indebted" to Freind. In at least one place he misquotes him badly, without indeed special acknowledgment, which may or may not aggravate the offence. Freind had observed, speaking of Ibn abī Uṣaibi 'ah, that 'it is something extraordinary that among so many whose lives he has described, there should scarce be any physician, whose writings we have met with, besides Mesue, Rhazes, and Avicenna'.[47] This is fair enough, and was no doubt the case, since Freind had not apparently seen the complete translation of Ibn abī Uṣaibi 'ah, made as already mentioned by Salomon Negri, though he could there have seen accounts of his favourites, Haly Abbas, Avenzoar, and Albucasis. Moir, however, makes Freind's statement into nonsense when he writes[48]: "In the catalogue [*sc.* of Ibn abī Uṣaibi 'ah] *scarcely a name worthy of remembrance* is recorded, except those of Mesue, Rhazes and

[44] *Op. cit.*, II, pp. 126-128.

[45] See *Studia semitica et orientalia*, II, *Presentation volume to William Barron Stevenson*, pp. 37-53.

[46] On the title-page, Edinburgh, 1931, in error.

[47] *Op. cit.*, II, p. 35.

[48] *Op. cit.*, p. 206, n. 1.

Avicenna." It is from misunderstandings like this that Arabic medicine in the West has at all times suffered.

Moir's book need not detain us. But something must be said of the learned English Arabist, William Alexander Greenhill, M.D., who while in practice at Oxford between 1839 and 1851 "turned his attention," as the *Dictionary of National Biography* says, "to the study of the Arabic and Greek medical writers," and in 1847, exactly a century after Mead's publication, produced yet another version of Rhazes *On Smallpox,* this time in English.[49] In it Greenhill displayed considerable knowledge of Arabic, particularly in determining the meaning of Arabic technical terms, of which he produced a table. At about the same time he also contributed articles on various medical writers to Smith's *Dictionary of Greek and Roman Biography* (1844-1849), where his knowledge of Arabic stood him in good stead. It is not necessary to give specimens of Greenhill's translation of Rhaezs, but recourse to it may be recommended as perhaps the speediest way to convince oneself of the elaboration and exactness of Rhazes' diagnosis and therapeutical method.

We have now come almost to modern times. Much yet remains to be done in the field of Arabic medicine, particularly, after Freind's fashion, in the Latin versions. The principal modern works have tended to give a series of *aperçus* on the subject, with some repetition. Outstanding in these studies was the late E. G. Browne, who combined in himself the ideal prerequisites, being at once a medical man, a product of St. Bartholomew's Hospital, and an outstanding Orientalist. Alas! the pressure of other commitments prevented him from contributing more than his agreeable and stimulating Fitzpatrick Lectures, delivered to the College of Physicians in 1919 and 1920 and published in 1921 as *Arabian Medicine.* Campbell's book[50] is much more ambitious and has indeed a great amount of valuable material, but its method leaves much to be desired. The present writer remains an impenitent admirer of Freind. It seems certain that if the examination of the Latin translations were to proceed side by side with examination of the originals and the results published, we should at this late day learn an amount which would surprise us.

49 London, Sydenham Society, 1847.

50 The full title is *Arabian medicine and its influence on the Middle Ages,* London, 1926.

51 A recent work (1951) from the Cambridge University Press (Cyril Elgood, *A medical history of Persia and the Eastern Caliphate, from the earliest times until the year A.D. 1932),* contains an amount of additional material, as its title implies.

The Invention of Eyeglasses

EDWARD ROSEN*

PART II

In Part I we saw that a reference to eyeglasses in a sermon preached by Giordano of Pisa gives us the approximate date of the invention. But the sermon talked about the inventor without specifying his name. So did the only other contemporary mention of him, which occurs in a Pisan *Chronicle*. This silence on the part of the sources later aroused great curiosity about his identity.

Salvino degli Armati

BUT in that case who was he?[148] Amid the uncertainty an ardent Florentine patriot nominated a candidate. In 1684,[149] six years after Redi's *Lettera,* Ferdinando[150] Leopoldo del Migliore[151] published an historical description of Florence. In discussing (p. 426) the church of Santa Maria Maggiore,[152] the chapels of which were renovated shortly before his time, Del Migliore said:[153]

There was another memorial which went to ruin in the restoration of that church.[154] It was faithfully recorded,[155] however, in our[156] ancient

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148 His existence was questioned by Del Guerra, who simply discarded "quidam" without explanation (*Ann. Ottalm.*, 1933, *61*, 384; cf. n. 37, above). The trick of retaining attractive portions of a document while deleting others of equally good authority may sometimes produce desired conclusions, but never history.

149 Not 1784, as in Albertotti. Alcune note riguardanti la storia degli occhiali. *Int. ophthal. Congr.* XII, St. Petersburg, 1914, Vol. 1, p. 152, and in *Riv. Stor. crit. Sci. med. nat.*, 1914, *5*, 321; nor 1584, as in Barduzzi, *op. cit.*, 1921, *12*, 30; nor 1690, as in Pagnini, Pietro. Origini storiche dell' ottica geometrica. *Rassegna nazionale*, 1917, *39*, March-April, p. 260.

150 Not "Leonardo," as in Haym, Niccola Francesco. *Notizia de' libri rari nella lingua italiana*, London, 1726, p. 74; *Biblioteca italiana*. Venice, 1728, p. 58; Milan, 1771-73, p. 106; Milan, 1803, vol. 1, p. 144.

151 Not "Signore," as in Trestelle (Giulio Martinez), *Boll. Ass. ottica ital.*, 1941, *15*, 8. Near the end of the nineteenth century Del Migliore was mistakenly called a "Florentine of the past century" by Caverni, *Storia del metodo sperimentale*, vol. 1, p. 500. He was assigned to the eighteenth century also by Singer, *Studies in the history . . . of science*, vol. 2, p. 399.

152 Which was located in France by Smith, E. Temple (*Med. J. Aust.* 1928, *15:2*, 579), and was demolished by Sorsby, *Short history of ophthalmology*, ed. 1933, p. 71.

153 *Firenze città nobilissima.* Florence, 1684, pp. 431-432.

154 The memorial had therefore disappeared by 1684, not 1755 (as in Petella, *Ann. Med. nav. colon.*, 1901, *7:1*, 843) nor 1758 (as in Rocchi, *Riv. Stor. crit. Sci. med. nat.*, 1913, *4*, 5), nor could it "still be found in the seventeenth century," despite Heller, *Geschichte der Physik*, vol. 1, p. 201.

155 Del Migliore does not say that he copied it or had it copied, despite Landolt, *Hygiène, Paris*, 1912, *3*, August, p. 14.

156 Not "the MS of another person," as Del Migliore was misquoted by Shastid, Thomas Hall. *American encyclopedia and dictionary of ophthalmology*, ed. Casey A. Wood. Chicago, 1913-21, p. 595.

register of burials.[157] It is very precious because by means of it we came to know about the first inventor of eyeglasses. He was a gentleman of this country [Florence], which is so highly renowned for genius in every subject requiring keenness of mind. He was Messer Salvino degl' Armati, son of Armato,[158] of a noble family which continues to give its name today to the Chiasso degl' Armati,[159] that short alley (for that is what "chiasso" means) stiuated behind the Centaur.[160] The statue of this man in ordinary dress was to be seen reclining on a large slab with letters around it, which said the following:

† Here lies Salvino degli Armati, son of Armato, of Florence, inventor of eyeglasses. May God forgive his sins. A. D. 1317.[161]

He is the one who is not named or specified by the ancient manuscript *Chronicle* in the monastery of the Dominican Fathers of Pisa.[162] Francesco Redi, a most excellent doctor of our times, quoted this *Chronicle* in his learned report on eyeglasses. In it we read that Friar Alessandro Spina, who lived in those same times and who perhaps was a Florentine and not a Pisan, sought to learn about the invention of making eyeglasses from someone who knew it and did not want to divulge it,[163] and that by himself Spina found a way of making them.

157 Del Migliore claims to have seen the inscription in a burial-register (sepoltuario), not in a burial place (sepolcro), despite Rambelli, *Intorno invenzioni e scoperte italiane*, p. 137. Del Migliore did not find the gravestone, despite Landsberg, C. Zur Geschichte der Erfindung der Brille. *ZentZtg Opt. Mech.*, 1890, *11*, 266; Bock, *Die Brille und ihre Geschichte*, p. 10; Rocchi, *Riv. Stor. crit. Sci. med. nat.*, 1913, *4*, 5; and Singer, *Studies in the history . . . of science*, vol. 2, p. 399; nor did he see the inscription carved on a slab, despite Albertotti, *Int. ophthal. Congr.*, XII, St. Petersburg, 1914, vol. 1, p. 152.

158 Not "Salvino d'Amarto," as the name was garbled by Oliver, *Brit. med. J.*, 1913, *2*, 1050; Singer, *Studies in the history . . . of science*, vol. 2, pp. 398-399; and Rufus Cole, *Ann. med. Hist.*, 1926, *8*, 349. Armato degli Armati was said to be, not the inventor, but the inventor's father, despite Francesco Palermo's index (p. 304) to Targioni's *Notizie sulla storia delle scienze fisiche in Toscano* (Florence, 1852).

159 Named after the family, and not after Salvino, despite Chevalier, Charles. *Manuel des myopes et des presbytes*. Paris, 1841, p. 14; Landolt, *Hygiène, Paris*, 1912, *3*, August, p. 14; and Ovio. Invenzione degli occhaili. *Ann. Ottalm.*, 1922, *50*, 691. A house on the Chiasso degli Armati bore the following inscription: "To honor the memory of Salvino degli Armati, inventor of eyeglasses in the thirteenth century, the brotherhood of his fellow-craftsmen on 5 July 1885 placed this stone here, where stood the house of the Armati" (*Riv. Stor. crit. Sci. med. nat.*, 1918, *9*, 444; Del Lungo, p. 53).

160 "The Centaur being slain by Hercules," a marble group carved late in life by the sculptor Giovanni Bologna of Douai (†1608), was originally emplaced in an intersection, then called Canto dei Carnesecchi, one block away from the Chiasso degli Armati. Desjardins, Abel. *La vie et l'oeuvre de Jean Bologne*. Paris, 1883, pp. 70, 148. After some moving about, the Centaur is now on display in the Loggia dei Lanzi, second row, right.

161 Not 1827, as in Carbonelli, Giovanni. Documenti figurati per la storia degli occhiali. *Rass. Clin. Terap.*, 1920, *19*, 66; nor 1417, as in Cancellieri, *Lettera . . . al . . . Koreff*, p. 292; nor "1318," as in *Enciclopedia italiana*, vol. 25, p. 115; nor "about 1285," as in Feldhaus, *Lexikon der Erfindungen und Entdeckungen* (Heidelberg, 1904), p. 13, and *Technik der Vorzeit*, col. 138. The year selected by Del Migliore for Salvino's death was confused by Albertotti with the date of Giordano's sermon (cf. n. 74, above). The date of Salvino's birth was given, with admirable precision but without any proof, as 1250 by Cecchetti, Bartolomeo. Delle origini e dello svolgimento dell' arte vetraria muranese. *Atti Ist. veneto*, 1871-72, series 4, *1*, 1691.

162 Nevertheless, according to Mme. Heymann (*Lunettes*, p. 5), the *Chronicle* named Salvino as the inventor of eyeglasses.

163 The correct statement that the inventor did not want to divulge the art was converted by Greeff (*Z. ophthal. Opt.*, 1919, *7*, 5; *Erfindung*, p. 86) into the misstatement that Spina did not want to name the inventor.

The candidate put forward by Del Migliore was seconded[164] by Manni, who was no less passionate a partisan of Florence.[165] But where as Salvino occupied only a tiny part of Del Migliore's bulky volume, Manni devoted an entire book to the subject (see n. 28, above). The two editions of his *Historical treatise about eyeglasses, invented by Salvino Armati, a Florentine gentleman* won widespread acceptance of Del Migliore's candidate to fill the place of the unknown inventor of eyeglasses.

The reclining statue of Salvino with its accompanying epitaph could no longer be seen in Del Migliore's day, as he himself implied.[166] But he claimed, it will be recalled, to have a faithful record in his "ancient register of burials."[167] His nephew[168] and heir "tells me it is still today in his possession," wrote Manni (p. 66), who significantly refrained from saying that he saw it.[169] But it was seen,[170] Manni hastened to add, by Cosimo della Rena, from whom he proceeded to quote (p. 67). The quotation, however, says merely that Del Migliore "discovered that the body of the said Salvino, who died in 1317 according to his epitaph, was buried in Santa

164 Salvino's name did not "appear for the first time" in Manni, despite Masson (*France méd.*, 1908, *55*, 202) and Von Rohr (*Naturwissenschaften*, 1919, *7*, 210); neither Salvino nor the Salvino legend was created by Manni, despite Albertotti. Ulteriori ricerche e studi intorno alla storia degli occhiali. *Società italiana di oftalmologia, Atti del Congresso 1924* (Rome, 1925), p. 93, Cirincione (*Ann. Ottalm.*, 1927, *55*, 930; cf. p. 932), and Ovio, *Storia dell' oculistica*, p. 226.

165 Manni (p. ix) explained that he wrote his *De florentinis inventis* on account of "the tender affection which I feel for the glory of my native land." He described his *Ragionamenti* (p. 41) as "a task undertaken by me through zeal for my native land," which must not be deprived of the inventor of eyeglasses. He proudly appended the adjective "Fiorentino" to his name. But somebody unfamiliar with such local pride deprived him of the authorship of his *Ragionamenti*, which was credited to D.M.M. Fiorentino instead of to D. M. Manni in the *Index-catalogue of the library of the Surgeon-general's office, United States army*. Washington, D. C., 1880-, series 1, vol. 13, p. 364.

166 Albertotti erred in saying (1914, p. 343) that Del Migliore "claims to have seen" the monument; same error in *Riv. Stor. crit. Sci. med. nat.*, 1914, *5*, 321, and in Davidsohn, vol. 4, part 2, Anmerkungen, p. 24. Del Migliore did not pretend that the monument still existed in his own time, despite Ovio, *Storia dell' oculistica*, p. 226.

167 Albertotti's error (*Atti Accad. Padova*, 1913-14, *30*, 312) in saying that Del Migliore published the epitaph "as having been seen by him in Santa Maria Maggiore" was converted by Greeff into a statement of fact: Del Migliore saw the Salvino epitaph not only in the church but in a church book (*Z. ophthal. Opt.*, 1914-15, *2*, 93). Manni did not relate that Del Migliore saw the tombstone inscription in Santa Maria Maggiore, despite Sorsby (*Short history of ophthalmology*, ed. 1933, p. 71).

168 Not "grandson," as in the German translation of Manni (*Allgemeines Magazin*, 1756, *7*, 22). "Nipote" is used in both senses; cf. n. 200, below, and the genealogy of the Del Migliore family in BNC, Magliabechi MS, cl. xxv, cod. 397, p. 18.

169 In Tempesti's words (p. 61), Del Migliore's case rested on "a sepulchral statue that *no longer exists*, and a memorial which recorded it and *was* in a private register of burials and which not even Manni himself saw with his own eyes" (italics in original).

170 This categorical statement was carefully avoided by Manni in both his previous treatments, where he inserted the qualifications "as I believe" (*De florentinis inventis*, p. 52) and "as it seems" (*Ragionamenti*, p. 103).

Maria Maggiore at Florence."[171] Out in the margin, moreover, Della Rena put this illuminating sidenote (which Manni chose not to quote): "Salvino Armati, inventor of eyeglasses, in the opinion of Ferdinando Leopoldo del Migliore." By labeling the Salvino story an opinion of Del Migliore's, Della Rena plainly showed his disinclination to accept it as established fact;[172] and he, be it noted, was one of six authorities who were thanked by Del Migliore for helping him with his work.[173] Nor did Della Rena say anything which would substantiate Manni's assertion that Della Rena saw Del Migliore's "ancient register of burials."[174] In fact, "nobody has seen this ancient register, even though all of Del Migliore's books and papers passed into the Magliabechiana [public library in Florence] and are carefully preserved there,"[175] as

171 Della Rena, Cosimo. *Della serie degli antichi duchi e marchesi di Toscana . . . parte prima.* Florence, 1690, p. 14. Della Rena quoted from Ferdinando Leopoldo del Migliore, not from his nephew G. B. del Migliore, despite Ovio, *Storia dell' oculistica,* p. 226.

172 Utterly unfounded is Nelli's statement (p. 157) that Del Migliore "showed" the Salvino inscription to Della Rena. In keeping with his pretense that Della Rena accepted the Salvino inscription without reservation, Nelli was forced to follow Manni's dishonest example in maintaining silence about Della Rena's damaging sidenote.

173 Fol. + 3*r*, p. 378. Del Miglore's relations with these authorities should be enough to refute the (unsupported) suspicion (Mazzuchelli, Giammaria. *Gli scrittori d'Italia.* Brescia, 1753-63, vol. 1, p. 682; Haym. *Biblioteca italiana.* Milan, ed. 1771-73, p. 106; ed. 1803, vol. 1, p. 144) that his *Firenze città nobilissima* was really written by another student of Florentine antiquities, Pietro Antonio dell' Ancisa (1609-93). Did the suspicion perhaps arise from a misunderstanding of Del Migliore's clumsy reference to himself in the third person (opposite p. 481)?

174 Della Rena remarked that Del Migliore "is still going to press with his very agreeable" memorials of Florence. "From these words it could perhaps be supposed," said Manni (p. 67), "that Migliore had not yet published his work which, although it went to press in the year 1684, is nevertheless known to have been finished after Rena's." Actually nothing of the sort is known, for Della Rena was too old and sick to finish his work (see p. ix), and Del Migliore's also was left uncompleted. Furthermore, how sound is Manni's supposition that Del Migliore's volume was not published as soon as printed in 1684? Della Rena's remark (appearing in 1690, but doubtless written before then) that Del Migliore "is still going to press" may well have been based on the self-description in Del Migliore's title: "First, second and third part of the first book." Issued in 1684, such a description would naturally suggest even six years later that Del Migliore was actively engaged in producing his "second book" (mentioned on fol. + 2*v*), in short, that he was "still going to press." Nothing more should be read into Della Rena's remark, certainly not that Del Migliore withheld his work from the public until after 1690. In fact Del Migliore himself said that his work "goes forth into the light today," 31 December 1684, when he dedicated the third part of the first book (between pp. 480 and 481). Yet what had been an (unsound) supposition on Manni's part subsequently became a positive statement in Nelli (p. 155).

175 Giovanni Batista del Migliore, the historian's nephew and heir, printed an undated *Catalogue* of four pages offering for sale "the manuscript books . . . containing various notes taken in different public places of the city and territory of Florence, and gathered by Ferdinando Leopoldo del Migliore." These MSS were bought by A. M. Biscioni, editor of Giordano's sermons. After Biscioni's death the MSS were presented to Florence's first public library, which had been founded to house Antonio Magliabechi's bequest. The director of the Magliabechiana at the time of the presentation was Targioni, who published Dati's *Veglia.* Targioni started a handwritten *Spoglio* (Summary) of the Del Migliore MSS, but had no time to analyze all the volumes. The *Spoglio* was completed by a continuator, who mentions (p. 13*v*) Biscioni's purchase of the MSS and their presentation to the Magliabechiana. This was later merged with another important collection in Florence to form the BNC, where the Del Migliore MSS and *Spoglio* are preserved today.

Canovai pointed out.[176] Albertotti[177] summarized the situation as follows:

> This is a question then of a monument and a document seen by one man.[178] Before Del Migliore's work nobody talks about Salvino degli Armati, inventor of eyeglasses; after it, people talk about Salvino, deploring the loss of the monument to his memory which formerly existed, according to Del Migliore, in the church of Santa Maria Maggiore, but which has been seen by nobody else, not even in fragments. . . . Del Migliore discovers an interesting monument which nobody had noticed for three centuries and which was already destroyed when he first talked about it; he quotes a burial-register seen only by himself.

The Armati Family

With regard to Salvino, Del Migliore merely said that he died in 1317 and that his father's name was Armato. So meagre an account of so important a personage spurred Manni to search Florentine records for information about the Armati family. He found (pp. 68-69) a Salvino degli Armati. But this Salvino held public office after 1317, and his father's name was Bartolo.[179] Therefore he could not be hailed as the inventor.[180] Nor could anyone else in the archives. Hence, being eager to strengthen the Florentine claim

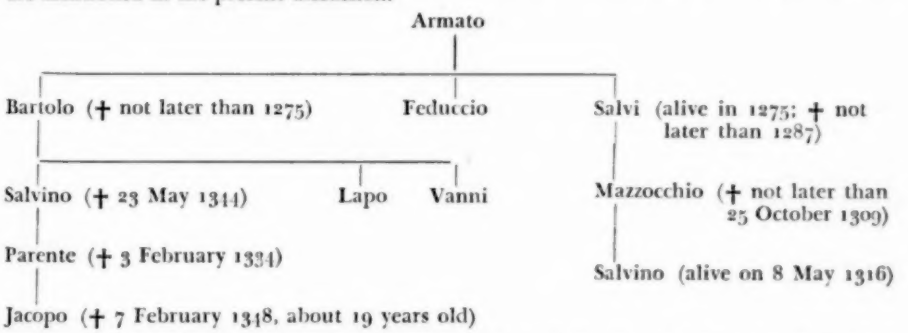
176 *Memorie*, vol. 2, p. 244. Canovai did not say that he personally conducted a search, despite Greeff (*Z. ophthal. Opt.*, 1919, 7, 6; *Erfindung*, p. 88).

177 1914, pp. 341-342. Presumably Giuseppe Albertotti is the illustrious professor "Giuseppe Martinotti," praised by Barduzzi (*Riv. Stor. crit. Sci. med. nat.*, 1921, *12*, 32).

178 For a correction of Albertotti's erroneous supposition that Del Migliore claimed to have seen the monument, cf. n. 166, above. Del Migliore did not base the Salvino story, nor did he say that he based it, exclusively on hearsay, despite D'Amico, Diego. Storia degli occhiali. *La filotecnica*, 1933, *3*, 196.

179 Reasoning that a man who died in 1317 could not hold public office twenty years later, Lorenzo Cantini pronounced the Salvino inscription apocryphal. *Saggi istorici d'antichità toscane*. Florence, 1796-98, vol. 5, p. 182. But Cantini mistakenly identified this public official as a son of Armato, whereas in fact he was a son of Bartolo. Despite this error of fact, Cantini's decision was correct. Luigi Passerini, on the other hand, who accepted the inscription as authentic, thought it must have been misread. Ademollo, Agostino. *Marietta de' Ricci*. 2d ed., Florence, 1845, p. 1008 (among the notes added by Passerini).

180 The following genealogical chart shows those members of the Armati family who are mentioned in the present discussion.


Armato
Bartolo (+ not later than 1275)
Feduccio
Salvi (alive in 1275; + not later than 1287)
Salvino (+ 23 May 1344)
Lapo
Vanni
Mazzocchio (+ not later than 25 October 1309)
Parente (+ 3 February 1334)
Salvino (alive on 8 May 1316)
Jacopo (+ 7 February 1348, about 19 years old)

In Manni's imaginative reorganization of the Armati family, the inventor became a brother of Bartolo and uncle of Salvino (+ 23 May 1344).

on the invention, Manni (who loved truth less and Florence more) performed a minor operation on another member of the Armati family, Salvi. His name was an alternative form of Salvino,[181] his father was called Armato,[182] and had he died in 1317, he would have conformed exactly to Del Migliore's specifications. But since he died long before 1317,[183] Manni labeled him a kinsman (consanguineo) of the inventor, implying thereby that Salvi's father was someone other than Armato. Banishing Salvi to a distant degree of relationship made room for a mythical Salvino, of whom the gullible might believe that his father was named Armato, that he died in 1317, and that he invented eyeglasses.

Manni ventured beyond Del Migliore with but a single fresh assertion about this mythical Salvino, namely, that he had a son Parente who died in 1333. The basis of Manni's assertion was undoubtedly the following obituary:

1333—Parente degli Armati, son of the late Salvino.

The predeceased father of a son who died in 1333 might well himself have died in 1317. Here finally was some semblance of documentary support for Del Migliore's inventor. Yet, strangely enough, in this instance Manni departed from his usual practice of citing his sources.

The burial of Parente degli Armati was recorded in an "old book of the dead" at the church of Santa Maria Novella.[184] A copy of this book was included in Del Migliore's MSS.[185] To these, whether at the home of the nephew who inherited them or of the scholar who bought them, Manni, as a friend of both these men, had access.[186] Del Migliore's copy was not taken directly from the original book, however, but from a previous copy, which had been

181 "Salvi, called Salvino," (who held public office after 1317) received power of attorney on 31 August 1309. Turning monk, "Friar Salvi, who formerly was called Salvino Armati, son of the late Bartolo," donated all his property on 20 May 1343 to his monastery. Florence, Archivio di Stato (hereafter designated "AdS"), Diplomatico, Carmine.

182 Salvi and Feduccio, brothers, and sons of the late Armato, on 3 October 1275 bought for themselves and for the sons of their late brother Bartolo, also a son of the said Armato, property located in the parish of Santa Maria Maggiore. AdS, Dipl., Carmine. This purchase was known to Del Migliore (BNC, Magliabechi MS, cl. xxv, cod. 407, p. 227).

183 In 1294-95 he was already the "late Salvi degli Armati," as Manni knew (p. 69). But even earlier, on 18 August 1287, fifty gold florins were borrowed by "Mazzocchio degli Armati, son of the late Salvi." AdS, Dipl., Carmine, under 24 August 1287.

184 This is the church within which Giordano preached the sermon important for dating the invention of eyeglasses and within which the ten story-tellers of Boccaccio's *Decameron* met. According to MS Ashburnham 533, fol. 55*v*, Giordano delivered the sermon within (intus) the church, not outside in the piazza of S. M. Novella, where Manni (pp. 72-73) mistakenly placed the preacher.

185 BNC, Magliabechi MS, cl. xxv, col. 391. Parente's obituary appears on p. 8 of the copy, which has a separate pagination following p. 270 of the codex.

186 Manni, pp. 63, 66; cf. n. 175 above.

made by Stefano Rosselli (1598-1664) and incorporated in his *Sepoltuario fiorentino.*[187] Did the Rosselli-Del Migliore version of Parente's obituary accurately reproduce the original entry in S. M. Novella's "old book of the dead"?[187.1]

In 1617, forty years before Rosselli finished his *Sepoltuario fiorentino,* S. M. Novella and its burials were described by a Friar Sermartelli[188] of the Dominican monastery there, who said:[189]

> In the old book of the dead there are found the following names of the following citizens who are buried in this church, for example . . .
>
> Parente Armati, son of Salvino, 1333.

Here Salvino degli Armati was not described as already dead at the time of his son Parente's demise in 1333.[190]

On 24 November 1333 "Parente Armati, son of Salvino, son of Bartolo," transferred all his property at Treviso to his father Salvino.[191] This gift shows who Parente's father really was. He was not a son of Armato,[192] nor did he die in 1317, since sixteen years later he was still increasing his fortune. He was in fact none other than the wealthy Salvino who held public office after 1317, whose father's name was Bartolo and who had nothing to do with the invention of eyeglasses.

This man of wealth and public position was connected by Manni with Rosselli's reference to a "monument of Salvino Armati in the cemetery in front" of S.M. Novella. Rosselli took this refer-

187 BNC, MS II IV 534-536 (formerly Magliabechi MS, cl. xxvi, cod. 22-24). As an introduction to his copy, Rosselli wrote a brief analysis of S. M. Novella's "old book of the dead" (BNC, MS II IV 535, fol. 730 *v*-731*r*). Much of Rosselli's introduction was repeated verbatim by Del Migliore (p. 1, preceding p. 1 of his copy). May we not therefore presume that not only the introduction but also the book was copied by Del Migliore from Rosselli?

187.1 This MS is preserved in the Archiepiscopal Archives of Florence (Orlandi, *Necrologio,* vol. 2, p. 614). Father Orlandi was good enough to verify the reading on fol. 3*v*: "Parens filius olim Salvini de Armatis de populo sancte Marie majoris.

188 Giovanni Sermartelli, according to Fineschi, Vincenzio. *Memorie sopra il cimitero antico della chiesa di S. Maria Novella di Firenze.* Florence, 1787, p. 147. Niccolò Sermartelli, according to Orlandi, *Necrologio,* vol. 2, p. 613.

189 AdS. MS 621 (Andrea Cavalcanti's copy of Sermartelli), fol. 148*r*. MS 812 (another copy, with annotations dated as late as 1772; see p. 131), p. 305.

190 This was the reading also in the copy of Rosselli consulted by him, said Del Lungo (p. 17). But he misread the entry (Florence, Biblioteca Riccardiana, Fondo Moreni, MS 320; p. 566 of the original numeration, fol. 419*v* of the modern numeration) as "Parens, filius Salvini." The copyist started to write "filius" a second time; but realizing his mistake after the third letter, over "fil" he wrote "olim." What Del Lungo evidently misinterpreted as a cancellation between "filius" and "Salvini" was in fact the familiar Latin word for "late." Hence this copy of Rosselli agrees with the others in (erroneously) referring to Parente's father as being in 1333 the "late" Salvino degli Armati. The same may be said for the version published by Ildefonso di San Luigi, *Delizie degli eruditi toscani,* Florence, 1770-89, vol. 9, p. 130.

191 AdS, Dipl., Carmine; cf. n. 282, below.

192 Even Del Lungo (p. 34) repeated Manni's falsehood that Parente's father was a son of Armato.

ence from "a note made by a careful person[193] concerning tombstones which have disappeared and are no longer present."[194] Neither the date of this Salvino's death nor his patronymic was indicated. However sorely tempted to supply "1317" and "son of Armato," Manni was precluded from attributing a monument in S.M. Novella to Salvino the inventor, because he had been interred by Del Migliore once and for all in S.M. Maggiore.[195] The S.M. Novella monument, belonging to an historical Salvino Armati, was accordingly assigned by Manni to the wealthy Salvino. In so doing Manni blundered.[196] For Salvino the wealthy, some nine years after his son Parente's death,[197] became a monk in S.M. del Carmine,[198] where he was buried,[199] the sepulture of "Friar Salvino degli Armati, son of Bartolo," being duly recorded in the *Ancient necrology of the Carmelite monastery at Florence.*[200] Then what about Salvino Armati the layman, whose monument once stood in front of S.M.

193 Tommaso Parigi, according to Sermartelli (MS 621, fol. 12*v*-13*r;* MS 812, p. 19). Florence, Biblioteca Marucelliana, Fondo Martelli, MS D 48, document 2, is a copy of Parigi's note concerning the "tombstones which have disappeared."

194 BNC, MS II IV 535, fol. 708*v*. Salvino's monument is here numbered 613 among those at S. M. Novella. The 56 burials at S. M. Maggiore described by Rosselli (fol. 921*r*-930*v*) include neither Salvino nor any other member of the Armati family.

195 This difficulty was overlooked by Fineschi, *Memorie sopra il cimitero*, p. 27, who assigned the S. M. Novella monument to Salvino the inventor.

196 His blunder was repeated by Del Lungo, p. 19.

197 3 February 1334 (1333, Florentine style). In BNC, MS II IV 535, fol. 737*v*, "1335" is a copyist's error.

198 AdS, Dipl., Carmine, 7 March 1342. Rosselli's account of S.M. del Carmine mentions a "silver reliquary which was made long ago by order of Friar Salvino degli Armati, Carmelite, whose arms are seen at the base of the said reliquary" (BNC, II IV 534, fol. 97*r*). Del Migliore too reported that "Salvino de Armatis, a friar of the said monastery, because of his devotion had a silver reliquary made bearing his arms in the form which is still visible to this day" (BNC, Magliabechi MS, cl. xxv, cod. 398, p. 69). Curiously enough, by confusion with Spina, the mythical Salvino was turned into a monk by Landsberg, *ZentZtg Opt. Mech.*, 1890, *11*, 266; Hübner, Walther. Ueber die Brille. *ReichsmedAnz.*, 1906, *31*, 264; Hill, Emory. Some historical data concerning glasses. *Ophthal. Rec.*, 1914, *23*, 506; Utstein. *Sight Sav. Rev.*, 1931, *1:2*, 42; and Bourgeois. Quel est l'inventeur des lunettes? *Chron. méd.*, 1923, *30*, 196. But the latter elsewhere (*Trav. Acad. nat. Reims*, 1903, *113*, 160; *Besicles*, p. 12; *Aesculape*, 1923, *13*, 147) conceived the mythical Salvino as a glassworker; so did Heller, *Geschichte der Physik*, vol. 1, p. 201; Pansier, *Hist. des lunettes*, p. 24; and Richard, *Les lunettes à travers les âges*, p. 27.

199 Since Salvino the wealthy was buried in S. M. del Carmine, it cannot be his grave that is "authentically registered by Rosselli in his *Sepoltuario* as being among those in front of the church of S. M. Novella," despite Del Lungo, p. 35. He erred again (p. 19) when he put Salvino's death, which occurred on 23 May 1344 "in the fourth decade of the fourteenth century." Instead of predeceasing Parente, Salvino outlived his son by 10 years, 3 months and 20 days. For his last will and testament, dated 20 January 1342 (1341, Florentine style), see AdS, Capitani d' Orsanmichele, vol. 470, fol. 224*r*.

200 *Necrologium antiquum conventus Carmelitarum Florentiae.* BNC, Conventi soppressi, MS F 4 785, fol. xxir. The *Necrologium* adds that Salvino "made his grandson (nepotem), his son's son or Friar Jacopo son of Parente, a friar of the order." Fortunately the ambiguity of the word "nepotem" induced the *Necrologium* to make it clear that Salvino, son of Bartolo, was Jacopo's grandfather and Parente's father. Friar Jacopo, "before his entrance into the said order, was called Jacopo degli Armati, son of the late Parente, son of Salvino." AdS, Dipl., Carmine, 17 July 1343. The direct line of descent from Salvino to Parente to Jacopo was known to Del Migliore (BNC, Magliabechi MS, cl. xxv, cod. 407, p. 256).

Novella? Was he Armato's son, Salvi, who died not later than 1287?[201] Or was he perhaps Salvi's grandson, Salvino, who was still alive in 1316?[202]

The Salvino Hoax

Permitting these questions to go unanswered for want of information, let us now try to conjecture how Del Migliore excogitated his hoax.[203] First he noticed in Redi's *Lettera* (Florence, 1678) that the *Chronicle* left the inventor of eyeglasses nameless. Here was a fruit ripe upon the bough, waiting to be picked and presented by Del Migliore to his beloved Florence. All he needed was a fellow-townsman to whom the invention could be plausibly ascribed. Suitable raw material lay at hand in the monument mourning an undated and fatherless Salvino Armati.[204] The year of death would of course have to be coordinated with Redi's estimate that the invention occurred between 1280 and 1311;[205] since the inventor may have attained maturity before the beginning of this period and also may have survived its close, he had better die not long after 1311. Very accommodating these Armati, an extinct family without a written genealogy. Their houses had been situated in the parish of S.M. Maggiore,[206] a church notable for its losses during successive reconstructions. These could easily have caused the inventor's memorial to vanish, just as the real Salvino monument had disappeared from S.M. Novella. And just as S.M. Novella's "old book of the dead" (called "Mortuario antico" by Del Migliore[207]) recorded tombstones no longer present, so the inventor's memorial could have been similarly listed in a document whose

201 See n. 183, above.

202 "Salvino Armati, son of the late Mazzocchio" was a party to an agreement dated 8 May 1316. AdS, Dipl., Carmine. Known to Del Migliore (BNC, Magliabechi MS, cl. xxv, cod. 407, p. 214).

203 For other examples of his skill in this art, see Del Lungo, pp. 18-19. For a general attack on Del Migliore's reliability, see Cinelli, *Storia degli scrittori* (BNC, Magliabechi MS, cl. ix, cod. 66, pp. 447-453), and *Biblioteca volante*, scanzia 14 (Venice, 1691), pp. 67-72; 2d ed. (Venice, 1734-47), vol. 1, pp. 169-173.

204 Del Migliore made a note of this monument (BNC, Magliabechi MS, cl. xxv, cod. 401, p. 262).

205 Redi's estimate is quoted in the text above, at n. 106.

206 Not in the parish of S. M. Novella, despite Passerini in the 2d ed. of Ademollo's *Marietta de' Ricci*, p. 1008. The Chiasso degli Armati (see n. 159, above) lies approximately halfway between the two churches, a little over a block from each. The Armati family lived in the parish of S. M. Maggiore, but were buried at S. M. Novella.

207 His nephew's *Catalogue* (of which an example is bound with Manni's copy of Del Migliore's *Firenze città nobilissima*, now at the British Museum) listed on p. 3 "two books, one in folio and the other in quarto, entitled 'Burial-registers,' one ancient and the other modern, of the city's churches"; the words "ancient" (antico) and "Burial-registers" (Sepultuarj) were underlined in ink by Manni. Was the *Catalogue's* ancient burial-register perhaps Del Migliore's copy (105 pages long) of Rosselli's copy of the "register of the dead buried long ago (anticamente) in this church of S. M. Novella"?

title would artfully suggest Rosselli's trusted *Sepoltuario fiorentino*. But the "Sepoltuario antico" were best privately owned, to discourage challenge by skeptics. Anyway, in this busy world when would anyone ever find the time to re-examine the archives, and from their complicated contents so reconstruct the past as to distinguish historical fact from skillful falsehood?

The Del Migliore-Manni thesis about Salvino was attacked in 1787 by Tempesti,[208] in 1791 by Canovai,[209] in 1796 by Cantini,[210] and in 1914 by Albertotti.[211] The decisive exposure of the fraud,[212] however, must be credited to Isidoro del Lungo (1841-1927), member of the Italian Senate and distinguished specialist in the history of the thirteenth and fourteenth centuries. Pointing out the lexicographical blunder committed by Del Migliore's inclusion of the word "inventor" in his fictitious Salvino epitaph of 1317, Del Lungo said (p. 38): "with regard to the word 'inventor,' we see in the fourteenth century only one example in the poetry of Petrarch,[213] and it does not begin to be a word in common use before the sixteenth century."

Manni's reason for quoting from Giordano's sermon the portion omitted by Redi should now be clear: he was eager to identify

208 Hence the first blow was not struck by Albertotti, as Cirincione would have us believe (*Ann. Ottalm.*, 1927, *55*, 937). According to Petella (*Ann. Med. nav. colon.*, 1901, *7:1*, 833; 1922, *28:2*, 67-68) and Scalinci (*Riv. Stor. crit. Sci. med. nat.*, 1933, *24*, 141-142), the authenticity of the invention attributed to Salvino and the existence of his epitaph were doubted in 1755 by Richa, Giuseppe. *Notizie istoriche delle chiese fiorentine*. Florence, 1754-62, vol. 3, p. 284. But in fact Richa accepted Manni's story about Salvino without expressing any doubt whatsoever, as is pointed out by Paatz, Walter and Elisabeth. *Die Kirchen von Florenz*. Frankfurt a. M., 1940-53, vol. 3, p. 616. This gullible writer's name was Richa, not Ristra, despite Ovio, *Storia dell' oculistica*, p. 226; and Richa's third volume was published in 1755, not 1775.

209 The attack in *Memorie*, vol. 2, was made by Canovai, not by Menici, despite Del Guerra, *Ann. Ottalm.*, 1933, *61*, 384; *Riv. Stor. crit. Sci. med. nat.*, 1933, *15*, Atti, p. 18. Nearly half a century after the *Memorie*, Giuseppe Menici wrote an article about Spina for the *Biografia dei Pisani illustri* (Pisa, 1838), wherein he repeated Canovai's attack of 1791 without adding anything of importance. Del Guerra's misascription to Menici of Canovai's contribution to the *Memorie* was echoed by Scalinci, *Riv. Stor. crit. Sci. med. nat.*, 1933, *15*, 141. Both Scalinci and Ovio (*Storia dell' oculistica*, p. 226) followed Petella (*Ann. Med. nav. colon.*, 1922, *28:2*, 63) in dating Canovai's attack on Salvino in 1817. But Canovai died in 1811; his *Prose varie*, published at Florence six years later, contained a reprint (pp. 23-37) of his essay on Spina, which had originally appeared a quarter of a century earlier in the *Memorie*.

210 See n. 179, above. These three eighteenth-century attacks refute Spera's statement (*Il giornale d'Italia*, 8 Sept. 1920, p. 3) that "nobody doubted this glory [of Salvino's] until our time."

211 "The famous Italian surgeon, Albertotti, who flourished at the time of Salvino," said Gordon, eliding six centuries (*J. med. Soc. N. J.*, 1951, *48*, 6). When a practitioner turns aside from treating the living patient to the writing of medical history, why does he sometimes forget professional standards of carefulness and accuracy? Is the past to be maltreated simply because it lies helpless and cannot defend itself?

212 As one indication of how far it spread and how long it persisted, see *Bausch & Lomb Mag.*, 1931 (July), *8*, no. 3, p. 8.

213 In his second *Trionfo della fama*, lines 125-126, Petrarch asked: "Where is Zoroaster, who was the 'inventore' of the magic arts?" This first occurrence of the word in Italian is at least three, and perhaps four, decades later than 1317.

as the unnamed inventor of eyeglasses Salvino degli Armati of Florence.[214] But, as Canovai pointed out (*Memorie*, vol. 2, p. 245),

> if a Florentine invented the art of making eyeglasses, then Giordano's attitude is quite ridiculous when, preaching publicly in Florence, he boasts of having known him, and says "I have seen the man who first invented and created it and I have talked to him." Most of the hearers could have replied, "Father, we saw him and talked to him before you."

Had the inventor been a Florentine, we might well expect in Giordano's reference to him before a segment of the population of Florence some tinge of local coloration. Does not its absence tend to confirm Canovai's objection? On the other hand, Giordano saw the inventor and talked to him; Spina saw the eyeglasses made by him; and both Giordano and Spina were friars at Pisa.[215] Hence, "the first inventor of so noble a device probably was a Pisan," as Dati concluded in the *Veglia*.[216]

Was Spina a Florentine?

Not content with fabricating a Florentine inventor of eyeglasses, Del Migliore (p. 431) sought to annex Spina too, as we saw above, by suggesting that "perhaps [he] was a Florentine and not a Pisan."[217] This suggestion was vigorously refuted by Canovai (*Memorie*, vol. 2, pp. 242-243), whose arguments may be briefly indicated. "Spina," a district of Pisa, gave rise to the name not only of the family "Della Spina" but also of the bridge "Ponte della Spina." Two Spina tombstones, one of the fourteenth century, stood in the church of St. Catherine. Pisan records from the twelfth to the sixteenth century mention many members of the Spina family. The *Chronicle* lists, besides Alessandro, seven other Spinas: Filippo, Leonardo, Jacopo, Gerardo (who bequeathed to the mon-

214 Manni even suggested (*Ragionamenti*, p. 116) that Salvino may have been present in the audience listening to Giordano's sermon on the occasion when the preacher referred to the inventor of eyeglasses.

215 Asserting there is much evidence that Spina and Salvino were closely linked to each other, Bock prudently refrained from specifying what the evidence is (*Die Brille und ihre Geschichte*, pp. 9-10). His mare's-nest reappeared in Barck (*St Louis med. Rev.*, 1904, *49*, 306; *Open court*, 1907, *21*, 212). Although Spina and Salvino were contemporaries, there is no reason to suppose that they ever met and talked to each other (despite Landolt, *Hygiène, Paris*, 1912, 3, Aug., p. 14) or that they were friends (despite Thompson, *Connoisseur*, 1934, *94*, 232). They certainly did not invent eyeglasses together (despite Bock, p. 12; Barck, *St Louis med. Rev.*, 1904, *49*, 306, and *Open Court*, 1907, *21*, 214; Oliver, *Brit. med. J.*, 1913, *2*, 1050; and Smith, *Med. J. Aust.*, 1928, *15:2*, 579-580); nor did Salvino learn about them from Spina (despite Gordon, *J. med. Soc. N. J.*, 1951, *48*, 5-6).

216 Targioni, p. 60. Dati concluded that the inventor *probably* (verisimilmente) was a Pisan. He did not *demonstrate* the inventor's Pisan origin, as Caverni mistakenly said (*Storia del metodo sperimentale*, vol. 1, p. 500). Nor did Dati seek the inventor "particularly in Florence," despite Greeff (*Erfindung*, pp. 84, 93-94).

217 Spina's monastery was in Pisa, not Florence, despite Gordon, *J. med. Soc. N. J.*, 1951, *48*, 5-6.

astery some land and a house in the district of Pisa called "Spina vecchia"), the friar Stefano Bonaiuti (whose father tried to snatch him away from the order), the lay brother Stefano de Pungelupis, and Ranieri; the *Annals* add three more: Paolo, Neri, Bartolomeo.[218]

Almost simultaneously with this rebuttal, Nelli (p. 153), reviving Del Migliore's suggestion, wondered whether Spina "could be a Florentine, and not a Pisan." Referring to the Spini, a "powerful and conspicuous family" at Florence, Nelli implied that any individual member thereof would be called "Spina"; yet he offered not a single example of this supposed practice, despite the prominence of the Spini[219] and his own intimate knowledge of Florentine history. In quest of support for Del Migliore's suggestion Nelli turned to Redi's writings. There he found, in Redi-Dati No. 2, "Alexander de Spina Pisanus" among "the exact words of the manuscript chronicle." But had Nelli consulted the Pisan MSS, he would instantly have recognized that Redi was quoting not the *Chronicle* but the *Annals,* and that furthermore Spina is described as "Pisanus" neither in the *Chronicle*[220] nor in the *Annals.* Both these MSS deal mainly with Pisans, "and hence it is that almost always nothing is said about their native country" (Canovai, *Memorie,* vol. 2, p. 242). Nelli also asserted that in Redi's *Lettera* "no statement about Spina's native country is to be found"; this mistake on Nelli's part is utterly inexcusable, for the very first time Redi mentions Spina in the *Lettera* he calls him "Frate Alessandro Spina Pisano."[221]

The Monument to Salvino

Redi issued a second edition of the *Lettera* (Florence, 1690), which differed from its predecessor only by the insertion of a quota-

218 *Chronicle,* pp. xx, 422, 447, 521, 547, 551, 554, 592, 598, 616.

219 A member of this family, Geri degli Spini, requested an Italian translation of a work compiled originally in Latin by Bartolomeo da San Concordio, who acceded to the request and dedicated the resulting Italian version (his *Ammaestramenti degli antichi*) to Geri degli Spini.

220 Despite Manni, *De florentinis inventis,* p. 53.

221 Noting that the Spina passage (incorrectly) ascribed to the *Chronicle* in Redi-Dati No. 2 was not identical with the Spina passage quoted in the *Lettera,* Nelli wondered (p. 153) whether "Redi made a mistake in quoting the *Chronicle* passage in two different ways." Characterizing Redi as a "careful and exact writer" (p. 152), Nelli believed (p. 159) that "he inserted the *Chronicle* passage from memory" in Redi-Dati No. 2, although Redi plainly said there: "I shall set down here below the exact words of the MS." Nelli's recourse to Redi's supposedly faulty memory is just as unsound as the similar Albertotti-Greeff thesis regarding Dati; cf. the passages cited in nn. 17-18, above.

tion from Petrarch.[222] Del Migliore's book had already been in circulation for six years. Did it fool Redi? Set a thief to catch a thief, says the old adage. But would Redi, a busy man in his middle sixties, have been disposed to undertake the investigations needed to rip the disguise off Del Migliore's masquerader? As things stand, in the second edition of the *Lettera* Redi made no mention of Salvino.[223] His silence has been variously interpreted,[224] but I know of no evidence that he was aware of the story about Salvino. This formed, as we have already seen, but a small segment of Del Migliore's ponderous tome; Della Rena's unenthusiastic reference to Salvino was published in the same year as the second edition of the *Lettera;* and as the pretended inventor Salvino was not effectively brought to the world's attention until, some forty years after Redi's death, he was glorified by Manni's dexterous and dissembling pen.[225]

Despite the obvious flaws in the Del Migliore-Manni thesis and the sharp attacks on it, Salvino came to be regarded, especially in Florence, as the inventor of eyeglasses. An eminent historian of mathematics, himself a Florentine by birth, chided his fellow-townsmen for failing to honor a compatriot who had brought glory to their city by an invention "the importance of which the Florentines have never understood."[226] The monument of 1317 (the sole support of the Salvino thesis) no longer existed (more properly, had never existed). To fill this horrid vacuum, an ersatz epitaph was fabricated, probably in 1841,[227] over five hundred years after the death it commemorated. This nineteenth-century reification[228] of a seventeenth-century fiction was coupled with a

222 This minor change (ed. 1678, p. 11; ed. 1690, pp. 11-12; *Opere*, vol. 2, p. 263) hardly justifies Andreini's assertion (p. 152) that Redi discussed the invention of eyeglasses "in different letters to Falconieri." The essential portion of the Petrarch passage had been inserted by Dati in the *Veglia* (Targioni, p. 61), and is quoted in the text below at n. 274.

223 Despite the assertion by Rouyer (*Coup d'oeil*, p. 20), Mme. Heymann (*Lunettes*, pp. 5-6), Papini (*Arte e storia*, 1920, *39*, 120-121), and Barduzzi (*Riv. Stor. crit. Sci. med. nat.*, 1921, *12*, 31) that Redi accepted Salvino as the inventor of eyeglasses.

224 Petella, *Ann. Med. nav. colon.*, 1901, *7:1*, 832; Albertotti, 1914, p. 342.

225 Salvino "claimed for himself the invention of spectacles," according to MacCallan, Arthur Ferguson. The origin and development of spectacles. *Med. World, Lond.*, 1951, *74*, 167. This novel doctrine assumes that the inscription was composed by Salvino; cf. n. 241, below.

226 Libri. *Histoire des sciences mathématiques en Italie*. Vol. 2, p. 75.

227 Not "1814," as in D'Amico, *La filotecnica*, 1933, *3*, 195-196.

228 There was no monument in the seventeenth and eighteenth centuries, despite Papini, Carlo. Chi ha inventato gli occhiali? *Arte e storia*, 1920, *39*, 121. The fraudulent character of the nineteenth-century monument is doubted by Ovio (*Storia dell' oculistica*, p. 227). But his questions about its purpose and financing only serve to reveal an astounding incomprehension of the internal political situation in the Grand Duchy of Tuscany prior to the unification of Italy.

marble portrait head of Greco-Roman type and ancient vintage;[229] mismated bust and stone were on display together for half a century, in the cloister adjoining the church of Santa Maria Maggiore, as the monument of Salvino.[230] In 1892 the cloister was cleared to make way for a school named after him,[231] and the synthetic monument was moved to a chapel in the interior of Santa Maria Maggiore.

On that occasion a new inscription was carved, reading "le peccata"[232] in place of Del Migliore's "la peccata." It has been plausibly suggested by Del Lungo (pp. 38-39) that Del Migliore introduced the erroneous form "la peccata" to impart an antique flavor to his fraud. But if this was his intention, his philological equipment was inadequate, since "la peccata" never existed at any stage of the language. Dante, who was born and grew up in Florence, spoke of the removal of sins (le peccata) [233] not long before the supposed date of the Salvino inscription. When this was reprinted by the first historian of Italian poetry, he quietly shifted to "le peccata," without calling attention to the fact that he was emending Del Migliore's text.[234]

But more than spelling was changed when Salvino was moved from the cloister to the chapel. It will be recalled that Del Migliore said nothing about a bust, instead of which his imagination had

229 The earliest reference to the bust which Albertotti could find was in *Notizie e guida di Firenze e de' suoi contorni*, Florence, 1841, p. 466 (not p. 406, as in Albertotti, 1914, p. 343, followed by Greeff, *Z. ophthal. Opt.*, 1919, *7*, 9; *Erfindung*, p. 89). The *Notizie* describes itself as a second edition. The *Guida per la città di Firenze e suoi contorni* (Florence, 1830, p. 157) makes no reference to the bust.

230 From a photograph of the monument a French artist created a design for an engraving which was published as the frontispiece of Arthur Chevalier's *Hygiène de la vue* (Paris, 1861; 2d ed., 1862; 3d ed., 1864). But in the epitaph, where Del Migliore wrote "perdoni la peccata," the artist, perhaps through unfamiliarity with the Italian language, put "perdonie a peccata." This meaningless jumble was permitted to appear in the text (p. 24, 1st ed.; p. 18, 2d ed.; p. 17, 3d ed.) as well as in the frontispiece, which was reproduced by Albertotti, 1914, table 1, left, and also by Greeff, who ascribed the book to Charles Chevalier, the author's father (*Erfindung*, pp. 89-90). In table 1, right, Albertotti shows the monument as photographed in 1891; so do the *American encyclopedia and dictionary of ophthalmology*, p. 594; Hallauer (cf. n. 75, above), p. 123; Pagnini, *Rassegna nazionale*, 1917, *39*, March-April, p. 259, in an article commemorating the six-hundredth anniversary of Salvino's "death"; Carbonelli, *Rass. Clin. Terap.*, 1920, *19*, 83, fig. 9; Greeff, *Erfindung*, table 8; and Trevor-Roper, Patrick D. Spectacles and their origin. *Med. ill.*, 1952, *6*, 360.

231 The name of the school was changed about 1925 (according to an elderly custodian), and the inscription reported in n. 150, above, has been removed.

232 A photograph of this second inscription, with "le peccata," may be seen in Albertotti, 1914, table 2, and Andrew, *Transactions of the Lancashire and Cheshire antiquarian society*, 1925, *42*, plate A.

233 *Divine Comedy*, Purgatory, 16.18; cf. Inferno, 5.9; Paradise, 17.33; 22.108; and Bartolomeo da San Concordio, *Ammaestramenti degli antichi*, 19.3.2.

234 Crescimbeni, Giovanni Mario. *Comentarj . . . intorno alla sua istoria della volgar poesia*. Rome, 1702-11, vol. 1, p. 187. His example was followed by Manni in *De florentinis inventis* (p. 52), by Canovai (*Memorie*, vol. 2, p. 244), and by Nelli (p. 156); but cf. Manni, p. 65, and *Ragionamenti*, p. 100.

conjured up a statue "reclining on a large slab." Accordingly when the new, or second, inscription and by now familiar bust were fastened to the chapel wall, beneath them was placed a statue lying prostrate on a tomb. The ancestral coat of arms on the chest of the prone figure proclaims him a member of the Del Beccuto family, whose chapel this is. The statue having lost its feet, the tomb was made to fit by cutting off nearly a quarter of its length. Along the top it bears an inscription which is almost illegible save for the date "1272"; and on the side a coat of arms so badly worn that the family could not be identified by Del Lungo, whose account I have followed here. This is how he summarized the situation (pp. 48-49):

> a Del Beccuto of the fifteenth century,[235] lying on a thirteenth-century sarcophagus of some other family; sarcophagus and Del Beccuto accommodated to each other's size as well as could be; dominating this handsome hodgepodge, a Greco-Roman head on a nineteenth-century base, with an inscription (also nineteenth-century) fabricated in the seventeenth century; the whole thing to honor and glorify a Florentine artisan and man of the people, who belonged to the seigniory and other magistracies of his commune in the fourteenth century, and of whom before the seventeenth century nobody ever dreamed that he invented eyeglasses.[236]

Roger Bacon

Before the Salvino legend gained wide circulation, an English rival appeared in the person of Roger Bacon. Although the arguments advanced on his behalf fall short of proving that he invented eyeglasses, he was nevertheless honored in certain quarters as the inventor.[237] He was even turned into a Belgian, in order to transfer the glory of the invention to that country a decade after it attained its independence.[238]

This attempt to alter his nationality by unsupported assertion had small effect until ingeniously linked four years later with events in Italy. Bacon, now proclaimed a Walloon, was said to have given an assortment of eyeglasses to Henry of Ghent, who in turn, on a

235 He is assigned to the first half of the fourteenth century and described as a cleric by Paatz, *Die Kirchen von Florenz*, vol. 3, p. 628. He was drawn as a cleric in the mid-eighteenth century by Giovanni Baldovinetti, whose *Sepoltuario* is preserved at Florence in the Biblioteca Riccardiana, Fondo Moreni, MS 339, p. 147.

236 In the publication where Del Lungo delivered the most devastating attack on the Salvino myth, he maintained that "the inventor of eyeglasses was really Salvino," said Bourgeois. *Chron. méd.*, 1923, 30, 197.

237 Rosen, Edward. Did Roger Bacon invent eyeglasses? *Arch. int. Hist. Sci.*, 1954, 7, 3-15.

238 De Caesemaecker, Frans Eugène (or, Francies Eugeen). *Aenmerkingen over de brillen*, pp. 12, 14. To that excellent scholar and warm-hearted gentleman, Dr. Jean Pelseneer, professor at the Free University of Brussels and secretary of the Belgian Committee for the History of Science, I wish to express my deepest gratitude for his generous assistance.

trip to the peninsula, transmitted them to Spina[239] in Pisa.[240] This neat little tale served a number of purposes at once. For it robbed both Italy and England of the invention, and it probed beyond Spina to the original inventor.[241]

Although cleverly contrived, this fable had a fatal weakness which was promptly exposed by a reviewer:[242]

> A serious reproach will not fail to be addressed to him [the author], namely, that he has not made known the sources from which he drew, a historical work having value only to the extent that it permits a check of the authorities on whom the writer bases himself.

This timely reminder of an elementary truth was little heeded, whereas the glib pronouncements which it censured penetrated the literature so thoroughly that their pernicious influence is, I fear, well nigh ineradicable. And yet not only did Bacon know nothing about eyeglasses but Henry of Ghent did not transport them to Italy, for the simple reason that he never set foot in that country.[243]

Unlike Redi and Del Migliore, who went to their graves with lips sealed, the actual author of this elaborate hoax confessed his misdeeds. Théodore-Adrien-Liévin Schellinck (1797-1867), a bibulous, impecunious, and unscrupulous journalist, in autobiographical notes[244] admitted the fraud.[245] The responsibility for it had been assumed by Caesemaeker, who permitted his name to appear as au-

239 Caesemaeker. *Notice sur les lunettes et verres optiques et sur les ophthalmies dans la ville de Gand et ses environs.* Ghent, 1845, pp. 14, 18-19, 36. Translation into French of Caesemaeker's Flemish book, *Aenteekening van verschillige merkwaerdigheden over de brillen en verdere zienglazen, en over de oogziekten in en omstreeks de stad Gent* (Ghent, 1845), with explanatory notes added by the translator, P. L. de Vroede.

240 When Smith (*Med. J. Aust.*, 1928, *15*:2, 580) and Thompson (*Connoisseur*, 1934, *94*, 232) retold this tale, they spoiled it by placing Spina in Florence. There is no evidence that Spina was ever in Florence.

241 Like Henry of Ghent, both Giordano and Spina withheld the inventor's name because Bacon had been thrown into prison by his ecclesiastical superiors, said Pansier (*Histoire des lunettes*, p. 23), followed by Bock (*Die Brille und ihre Geschichte*, pp. 13-14) and Bourgeois (*Trav. Acad. nat. Reims*, 1903, *113*, 158, 160; *Besicles*, pp. 10, 12; *Aesculape*, 1923, *13*, 146-147). But the invention of eyeglasses was first claimed for Bacon almost four centuries after Giordano's death; and to say that Spina did not reveal the inventor's name implies that the author of the *Chronicle* entry about Spina was Spina himself. This is like believing that Moses wrote the Pentateuch, which tells about Moses' death and burial (Deuteronomy 34:5-6).

242 Cunier, Florent. *Ann. Oculist., Paris* (then published in Brussels), 1846, *16*, 131.

243 The legend of Henry's Italian sojourn was shattered by Ehrle, Franz, *Archiv für Litteratur— und Kirchengeschichte des Mittelalters*, 1885, *1*, 370-383, 507-508. Cf. Wulf, Maurice de. Histoire de la philosophie scolastique dans les Pays-Bas. *Mém. cour. Acad. R. Belg.* 1894-95, *51*, 46-51.

244 Preserved in MS at the library of the University of Ghent; see the first document, page 27, no. 10. I wish to thank the library's director, Dr. E. Van de Casteele, for his friendly co-operation.

245 Van der Haeghen, Victor. Mémoire sur des documents faux. *Mém. cour. Acad. R. Belg.* 1898-99, *58*, 125-126. For Schellinck's many other falsifications, see the article on him by Van der Haeghen in *Biographie nationale . . . de Belgique*. Brussels, 1866-1938, vol. 21, col. 664-667.

thor of both the Flemish and French versions of the book.[246] The translation had been done by Schellinck himself ("De Vroede" being a nom de plume), while a certain interested family had paid most of the costs of publication.

The Spina Passage in the Chronicle

The Caesemaeker fake may therefore be tossed into the trash basket alongside Redi's imaginary MS and Del Migliore's phantom inventor, leaving as our most important authentic source for the origin of eyeglasses the *Chronicle* passage about Spina. Its historical contents would look entirely different, however, if Del Lungo (p. 6) were right in holding that Spina's

> anonymous predecessor (quidam)[247] was introduced, like a character in fiction, by pious chronicle legend, in order to exalt the evangelical kindliness of the good friar in contrast with the other's unfruitful selfishness.

This interpretation strikes me as utterly out of harmony with the sustained mood of the entire *Chronicle,* which pretty much confines itself to rather jejune narratives of deceased friars. Did Del Lungo, with all his vast knowledge of the period, really take the trouble to examine the *Chronicle* before consigning its anonymous inventor of eyeglasses to the dream world of fiction?[248] And if the chronicler felt free, as Del Lungo assumed, to depart from the facts, would he not rather have made Spina the sole inventor (and therefore an immense benefactor of mankind) instead of a mere promulgator (and therefore the deuteragonist in a trite moral lesson)?

Gratuitously banishing the anonymous inventor from the realm of history, Del Lungo (pp. 6, 10, 41) saluted Spina as the inventor. He even ascribed this opinion to Dati,[249] who in fact had taken no such view of the matter. But afterwards Del Lungo must have real-

246 As nominal author of a book which had received adverse comment in *Ann. Oculist., Paris,* Caesemaeker replied (1847, *17,* 76-79), mentioning Schellinck by name and quoting some examples of his art at its best.

247 The *Chronicle's* term for the unknown inventor was not "quidam," as Del Lungo would have it (pp. 6, 19, 24), but "alio"; we saw above that "quidam" occurs in the *Annals,* as Del Lungo himself pointed out (p. 6). Nevertheless "quidam" was assigned to the *Chronicle* by Greeff (*Dtsch. opt. Wschr.,* 1922, *8,* 602), D'Amico (*La filotecnica,* 1933, *3,* 196) and Del Guerra (*Ann. Ottalm.,* 1933, *61,* 384; *Riv. Stor. crit. Sci. med. nat.,* 1933, Atti, p. 18).

248 Del Lungo supposed the anonymous inventor to be a product of the chronicler's imagination, not of Spina's, despite Papini (*Arte e storia,* 1920, *39,* 121) and Ovio (*Ann. Ottalm.,* 1922, *50,* 693).

249 Del Lungo, pp. 20-21; same error previously in Caverni, *Metodo sperimentale,* vol. 1, p. 500; cf. n. 216, above. "Precise in his every assertion" was the tribute paid to Caverni by Andreini (p. 130), who found himself obliged (pp. 148-149) to correct a misstatement by Caverni.

ized that here he stood on shaky ground. For his most succinct characterization of Spina as the "true inventor," on later reflection he omitted from his second edition.[250] And in a letter dated 23 June 1922 he wrote: "I leave to scholars and experts the investigation and discussion"[251] of the question to whom the invention should be attributed.

Taking issue with Redi's view in the *Lettera* (*Opere,* vol. 2, p. 261) that the passage about Spina was written by Bartolomeo da San Concordio, the first of the four chroniclers,[252] Del Lungo (p. 21) assigned it to Domenico da Peccioli, the third chronicler.[253] In the Prologue to the *Chronicle* (p. 401) Domenico himself declared that whereas Bartolomeo had written briefly about the earlier friars, he (Domenico) would treat the later friars in a broader style with due praise, while from chronicles and proceedings of chapter meetings he would add material which both his predecessors had not troubled to record in the biographies composed by them. Domenico's stylistic criteria would indicate, it seems to me, that he lengthened and embellished No. 1, 10, 37, 39, 84, 107, (Giordano), 108, and 109. But No. 113, the Spina story, brief and unadorned, I should agree with Redi was a product of Bartolomeo's stingy pen.[254] It was not written by Domenico on the basis of hearsay nearly a century after the event, as Von Rohr would have us believe (*ZentZtg Opt. Mech.*, 1920, *41*, 394-395).

If we are right in regarding Bartolomeo da San Concordio as the author of the Spina story,[255] does it follow that the *Chronicle* contains the earliest reference to eyeglasses?[256] Spina was recorded

250 Cf. 2d ed., p. 56, with 1st ed., p. 41. No such second thoughts troubled Del Guerra, who falsely declared that the *Chronicle* and *Annals* attribute the invention to Spina (*Ann. Ottalm.*, 1933, *61*, 382; *Riv. Stor. crit. Sci. med. nat.*, 1933, *24*, Atti, pp. 14-16). From the *Biografia dei Pisani illustri* (Pisa, 1838) Del Guerra reprinted a portrait of Spina "as he was seen by the eyes of a fellow-townsman later." Five hundred and twenty-five years later.

251 Petella. *Ann. Med. nav. colon.*, 1922, *28:2*, 56.

252 Redi's sensible statement was twisted by Barduzzi (*Riv. Stor. crit. Sci. med. nat.*, 1921, *12*, 31) into the ludicrous blunder (which was not committed by Redi, nor by anyone else for that matter) that Bartolomeo had much to do with the invention of eyeglasses.

253 Redi himself had once expressed the same opinion (Redi-Dati No. 2; *Opere*, vol. 5, p. 84). But at that time, although he thought he was discussing the Spina passage in the *Chronicle*, he was actually talking about the *Annals*, which were not written until long after Domenico's death.

254 Mme. Heymann's gratuitous attribution (*Lunettes*, p. 5) of the Spina passage to Ugolino, the second chronicler, was repeated by Reis, *Folia ophthal. orient.*, 1932-34, *1*, 399. For the self-contradiction inherent in Ovio's view (*Storia dell' oculistica*, pp. 229, 232) that the author of the Spina passage was Spina himself, see n. 241, above.

255 Manni, who also was of this opinion, said (p. 42) that Bartolomeo described eyeglasses as a "novum inventum." That expression occurs, however, not in the *Chronicle*, but in the *Annals*, which were written two centuries after Bartolomeo's death. Similarly, "vitrea specilla" in the *Annals* was erroneously assigned to the *Chronicle* by Manni (*Ragionamenti*, p. 110).

256 As was maintained by Petella (*Ann. Med. nav. colon.*, 1901, *7:1*, 831) and Del Guerra (*Ann. Ottalm.*, 1933, *61*, 382-383; *Riv. Stor. crit. Sci. med. nat.*, 1933, *24*, Atti p. 16).

in the *Chronicle* (which is really a necrology, as we saw in n. 136, above) only after his death early in 1313.[257] But Giordano had mentioned the invention seven years earlier, in his sermon of 23 February 1306. Preaching in the vernacular, Giordano used the word "occhiali" for eyeglasses, whereas the *Chronicle*, being written in Latin, called them "ocularia." Did the latter term make its debut in the *Chronicle*?[258] Perhaps earlier is the use of "ocularia de vitro" in the prologue to Book IX of Giovanni da San Gimignano's *De exemplis et similitudinibus rerum*.[259] This collection of handy comparisons for enlivening sermons was composed by the Dominican preacher between 1298 and 1317 (or 1314), according to a recent study.[260]

The Earliest Medical Reference to Eyeglasses

In the opening years of the fourteenth century a treatise entitled *Lilium medicinae* was written by Bernard Gordon, professor of medicine at the University of Montpellier. "In his chapter on weakness of vision . . . he clearly mentions the eyeglasses which old people use to see small letters," said a renowned medical historian in 1585.[261] In the *Veglia* (Targioni, p. 60) Dati referred to Bernard, evidently without knowing the *Lilium* at first hand. But Redi's *Lettera* (*Opere*, vol. 2, p. 262) quoted its recommendation of a salve that "would make the aged read small letters without

257 Hence the *Chronicle's* use of "ocularia" was not earlier than 1305, despite Manni, pp. 3-4, 42.

258 Bartolomeo did not use the term in his *Ammaestramenti*, despite Chas. Chevalier, *Manuel des myopes*, p. 4.

259 BNC, Conventi soppressi, MS A 4 517 (the handwriting of which would appear to be of the fourteenth century), fol. 314r, agrees with the printed editions in reading "ocularia de vitro." In this instance, therefore, the printers did not alter the MS, as they did in certain other cases which we shall examine soon. These alterations, if overlooked, can produce serious distortions of historical developments.

260 Dondaine, Antoine. La vie et les oeuvres de Jean de San Gimignano. *Archivum fratrum praedicatorum*, 1939, 9, 164.

261 Mercuriale, Gerolamo. *Variae lectiones*. Ed. Paris, 1585, bk. 6, ch. 19, p. 376. Mercuriale's Latin was misunderstood by Masson (*France méd.*, 1908, 55, 201) to mean that Bernard himself "was farsighted . . . [and] wore eyeglasses." Moreover Masson attributed this statement, not to Mercuriale, but to another physician, Vopiscus Fortunatus Plempius. The latter "found no mention of eyeglasses among medical writers until after 1300," said Dati (Targioni, p. 60). This statement was made orally by Plempius to Libertus Fromondus, who published it in his commentary on the *Natural questions* in Seneca's *Opera*, 4th ed. by Justus Lipsius (Antwerp, 1652, p. 842). Confusing Fromondus' baptismal name with the designation of a manumitted slave in ancient Rome, Greeff called Descartes' well-known adversary "the freedman Fromondo" (*Z. ophthal. Opt.*, 1917, 5, 76). Redi sent Dati a letter about a reference to eyeglasses by a theologian whom he dated (inaccurately) not long after 1300. *Lettere inedite . . . a Carlo Dati*, ed. Jarro (pseudonym of Giulio Piccini). Florence, 1889, p. 15. The theologian's name duly appeared in Dati's *Veglia*, as the first word in the last sentence. But the name is followed only by the abbreviation "etc.," and then the *Veglia* breaks off unfinished. By contrast, other contributions by Redi to the *Veglia* were incorporated by Dati in the body of the text. May we not therefore surmise that the letter about the theologian, the date of which has not been preserved, was written after Redi-Dati No. 1, 2 and 3, say, beween March, 1674, and May, 1675?

eyeglasses (ocularibus)." For over two centuries Bernard's dismissal of eyeglasses,[262] so soon after their invention, was accepted as historical fact. Then Albertotti noticed (*Mem. R. Accad. Modena,* 1896, series 2, *12,* xv) that in five MSS of the *Lilium* this sentence does not agree with the printed editions. After examining two additional fourteenth-century MSS, Pansier (pp. 134B-C) concluded that what Bernard actually wrote was "oculo berillino." This last word was so unfamiliar to the copyists that they resorted to some strange variants. Hence the first edition (Naples, 1480) reads "oculo veredino."[263] It is only in the subsequent editions, beginning with that of Ferrara, 1486 (fol. 12r), that "ocularibus" appears. Therefore it was used, not by Bernard early in the fourteenth century, but by his editors nearly two hundred years later. And the replacement of "oculo berillino" by "ocularibus" cannot possibly have preceded the *Chronicle's* mention of "ocularia." Did "oculo berillino" (eye of beryl) in Bernard's *Lilium* signify "eyeglasses," as Pansier thought,[264] and can we conclude with him that it was the term then in use to designate the new invention? I am much more inclined to agree with Albertotti that we can by no means be certain that Bernard mentioned eyeglasses.[265]

Arnold of Villanova, who also taught medicine at the University of Montpellier, "adduces the invention of eyeglasses," Lynn Thorndike maintained.[266] As proof, he offered the following passage from Arnold's treatise *On preserving youth and retarding old age,* composed about 1310:

Palam autem est quia obiectum politicum et diaffanum est aggregatum visus eius congregans disgregatum.

Thorndike prudently refrained from attempting a translation, for what he printed makes no sense.[267] Arnold has just said that an old

262 He did not recommend their use, despite Georges Lafenestre in the preface to Mme. Heymann's *Lunettes,* p. VI.

263 Particula 3, chapter 5. This edition carries no printed pagination. But in the copy in the Old Bodleian Library at Oxford, where the pages have been numbered by hand, the passage occurs at p. 82*v*.

264 So did Singer (*Studies in the history . . . of science,* vol. 2, pp. 399-400), Garrison (*Introduction to the history of medicine,* 4th ed., p. 185), Sarton (*Introduction,* vol. 3, p. 874), and Gordon (*J. med. Soc. N. J.,* 1951, *48,* 6). For a different interpretation, see n. 290, below.

265 Nevertheless we are assured by Benjamin L. Gordon (*J. med. Soc. N. J.,* 1951, *48,* 6) that his namesake Bernard Gordon credited the invention of eyeglasses to Salvino degli Armati.

266 *A history of magic and experimental science.* New York, 1923-41, vol. 2, p. 859. Thorndike called him "Arnald of Villanova," a hybrid form. In Latin he is known as "Arnaldus de Villanova"; in Italian, as "Arnaldo da Villanova"; and in German, as "Arnald von Villanova." If the designation of his birthplace is anglicized, why not also his given name for the sake of consistency?

267 The actual reading is "aggregativum," not "aggregatum." Moreover, "politicum" is obviously an error, which should have been replaced by "politum."

man would see as well as a youth if he had a youthful eye.[268] Then comes Thorndike's passage: "It is known that a political ['polished' was probably intended] and clear object concentrates its rays by gathering together what has been scattered." So read the editions of Arnold's *Opera* that were published at Lyon in 1504 (fol. 87v), 1509 (fol. 88v) and 1532 (fol. 88v). But the Basel *Opera* of 1585 (col. 825) wisely deleted "politicum." In my eyes, however, the entire passage is suspect, because the separate edition of the treatise (Leipzig, 1511, fol. b3r) omits it altogether. We are confronted, I believe, by another instance of what we saw in the case of Bernard Gordon.[269] The MSS of Arnold's treatise, I suggest, did not contain Thorndike's passage[269.1]; in a garbled form it was inserted in the early printed editions; a later and more alert editor removed the nonsensical "politicum." Pansier and Hirschberg held that Arnold never mentioned eyeglasses.[270] In the passage quoted by Thorndike he certainly does not "adduce the invention."

Eliminating Arnold of Villanova as well as Bernard Gordon leaves Guy de Chauliac, a third professor at Montpellier, as the earliest medical writer to mention eyeglasses. In his *Chirurgia magna*, which he completed in 1363,[271] Guy said: "And if these things do not avail, recourse must be had to spectacles of glass or beryl (ocularios vitri aut berillorum)."[272] Guy's work was first printed in a French translation (Lyon, 1478) which rendered his recommendation thus: "auculaires de voyre ou de bericle" (fol. A4r). The spelling becomes more familiar in the revised translation of Lyon, 1520: "oculaires de verre" (fol. 285v); and in the further revised translation of Lyon, 1580, the modern French ex-

268 An unacknowledged echo of Aristotle, *De anima* i.4, 408*b* 21-22.

269 The same may be said about Trotula, the famous woman physician of Salerno, who lived about 1100. The printed version of her book *On women's diseases* contains a disparaging reference to eyeglasses which could not be found in the MSS by Pansier, *Histoire des lunettes*, pp. 19-21. It was added by a later hand, as was pointed out long ago by Joseph-François Malgaigne in the introduction to his edition of Ambroise Paré's works (Paris, 1840-41), vol. 1, pp. xxiii-xxiv; the attempted refutation by Pansa (*Bibliofilo*, 1886, 7, 18-19) leaves Malgaigne's position unweakened.

269.1 It does not appear, for example, in the Breslau MS published by Johann Schwartz (Leipzig, 1924).

270 Pansier, *Histoire des lunettes*, p. 19; *Mém. Acad. Vaucluse*, 1903, series 2, 3, 5. Hirschberg, *Geschichte der Augenheilkunde*, vol. 13, p. 270. An assertion to the contrary needs correction in Garrison, *Introduction to the history of medicine*, 4th ed., p. 185.

271 Not 1303, as in Chas. Chevalier, *Manuel des myopes*, p. 8.

272 This is the reading of all the copies consulted by Edouard Nicaise, who edited Guy's *Grande chirurgie* (Paris, 1890), pp. 491-492. Dati (Targioni, p. 61) quoted "conspicilia vitri, seu becyclos" from the Lyon edition of 1585, p. 315. Its editor, Laurent Joubert, had arbitrarily replaced "ocularios" by "conspicilia," and "berillorum" by "becyclos," substitutions unsuspected by Dati and, for that matter, also by Albertotti (1914, p. 333), who admitted Joubert's "conspicilia" and "becyclos" to what he called Guy's "well-known sentence."

pression appears: "lunettes de verre" (p. 529). As these vernacular equivalents show, Guy used "ocularios" to mean "eyeglasses."[273]

About ten years later Petrarch (1304-74) said, near the beginning of his autobiographical *Letter to posterity:* "for a long time I had very keen sight which, contrary to my hopes, left me when I was over sixty years of age, so that to my annoyance I had to seek the help of eyeglasses (ocularium . . . auxilium)."[274]

In his eighty-third Novella, Franco Sacchetti (c. 1330-c. 1400) had a prior of the Florentine republic say: "I don't see well without my eyeglasses (occhiali)." This prior having held the post as early as 1346, Manni (p. 51) disingenuously permitted his readers to assume the Sacchetti passage could be applied to that year. But the story concerns three men who were priors at the same time, and the only term of office fulfilling that condition is 1358.[275]

Three earlier Italian references to spectacles in the fourteenth century have thus far been found in unpublished MSS. In 1316 eyeglasses with case (occulis de vitro cum capsula) cost six Bolognese soldi.[276] In 1322 an inventory of worldly possessions left behind by a Florentine bishop included "one pair of eyeglasses, framed in gilded silver (unum par occlalium, foltorum de argento deaurato)."[277] In 1329 an official complaint lodged by a merchant from a town in eastern Tuscany listed, as part of the goods which he had bought in Florence and which were stolen from him on his way home, "one pair of eyeglasses (unum par ochialium)."[278]

The Earliest Occurrence of Eyeglasses in Art

The oldest known work of art depicting spectacles is a portrait at Treviso,[279] in what was formerly the monastery of San Nicolò,

273 Not "makers of eyeglasses," despite Von Rohr, Acht Vorlesungen zur geschichte der Brille. *ZentZtg Opt. Mech.*, 1920, *41*, 394. Aus der Geschichte der Brille. *Beitr. Gesch. Tech. Industr.*, 1927, *17*, 31-32, and Sarton, *Introduction*, vol. 2, p. 1026. Nor did Guy speak of eyeglasses "as a recent invention," despite Richard, *Les lunettes à travers les âges*, p. 26. But he did speak of them, despite Ronchi's statements that "no scientist and no philosopher mentions eyeglasses in his writings"; that the "learned world never spoke of them anywhere for more than three centuries"; and that "they were mentioned in absolutely no book." *Rivista di oftalmologia*, 1946, *1*, 142. *Storia della luce*, Bologna, 1939, p. 63; 2d ed., 1952, p. 54.

274 Petrarch makes the general statement "Man revives his weakened vision with eyeglasses (ocularibus)" in *De remediis utriusque fortunae*, bk. 2, ch. 93.

275 As Manni knew perfectly well (*Ragionamenti*, p. 124). Marchionne, *Cronaca fiorentina* (Muratori, *Rerum italicarum scriptores*, 2d ed., vol. 30, part 1. Città di Castello, 1903-13), p. 252.16-18. It is barely possible, though unlikely, that a practice familiar when he wrote the eighty-third Novella was anachronistically transferred by Sacchetti to the setting of his story, some two to four decades earlier.

276 Albertotti, *Atti Soc. med-chir. Padova*, 1923-24, *2*, 175.

277 Davidsohn. *Geschichte von Florenz*. Vol. 4, part 2, Anmerkungen, p. 24.

278 Davidsohn. *Forschungen zur Geschichte von Florenz*. Berlin, 1896-1908, vol. 3, p. 190, no. 955.

but is now the archiepiscopal seminary.[280] The subject of the portrait is Hugh of St. Cher. From the painting's realistic style Albertotti inferred (1922, p. 101) that Hugh actually wore eyeglasses, but in fact he was in his grave more than twenty years before they were invented.[281] Since he died over six decades before the birth of Tommaso[281.1] da Modena, the painter of his portrait, he was never seen by the artist. When the latter put glasses on Hugh's nose, he committed an anachronism which tells us that they were familiar in the painter's lifetime, not in Hugh's.

The portrait having been painted at Treviso (nearly a century after Hugh's death), Albertotti assumed that he lived there (although there is no evidence that he ever set foot in that town). Yet Hugh, who never saw Treviso and never wore glasses, was Albertotti's sole argument (*Ann. Ottalm.*, 1924, 52, 274) that they were known there while Salvino the wealthy was busily accumulating his fortune by lending money at Treviso.[282] Making the additional assumption that glasses were not yet known at Florence, Albertotti maintained that Salvino the wealthy introduced them to Florence from Treviso. In this way, moreover, he sought to explain the attribution of the invention to the mythical Salvino.[283] But the sojourn of the money lender Salvino at Treviso was unknown alike to Del Migliore, who created the imaginary Salvino, and to Manni, who successfully publicized him.

Hugh's portrait was painted by Tommaso da Modena in 1352, as is known from an inscription.[284] With characteristic carelessness about chronology (a historian's indispensable guide), Albertotti sometimes dated the painting in 1360.[285]

279 Albertotti. Zincotipia di una figura con occhiali dipinta da Tommaso da Modena nell' anno 1352. *Ann. Ottalm.* 1904, 33, 787-790. Other reproductions of the portrait in *Janus*, 1904, 9, 614-615; Berthier, Joachim-Joseph. *Le chapitre de San Nicolò de Trévise*, Rome, 1912, p. 33; *Atti Accad. Padova*, 1913-14, 30, 313; Hallauer (cited in n. 75, above), p. 125; Greeff, *Erfindung*, frontispiece; *Transactions of the Lancashire and Cheshire antiquarian society*, 1925, 42, plate B; *Ann. Ottalm.*, 1927, 55, 936; *La filotecnica*, 1933, 3, cover of the January issue; and Coletti, Luigi. *L'arte di Tommaso da Modena*, Bologna, 1939, table 1.

280 Not the cathedral, despite Trestelle (Giulio Martinez), *Boll. Ass. ottica ital.*, 1941, 15, 9.

281 Quétif, Jacques and Echard, Jacques. *Scriptores ordinis praedicatorum*. Paris, 1719-21, vol. 1, p. 196.

281.1 Not Gustavo, as in Ovio, *Storia dell' oculistica*, p. 230.

282 Salvino degli Armati, son of Bartolo, was one of the Florentine money-lenders at Treviso, where the municipal archives record him in 1316 as having been a resident for over thirty years. Marchesan, Angelo. *Treviso medievale*. Treviso, 1923, vol. 1, pp. 232, 427-429. If he attained the age of maturity before entering the money-lending business at Treviso, then he was born about 1265, and was almost eighty when he died on 23 May 1344 (cf. n. 199, above).

283 *Società italiana di oftalmologia, Atti del Congresso 1924*, p. 93.

284 Reproduced in *Ann. Ottalm.*, 1927, 55, 936, and in Coletti's *Treviso* (Rome, 1935. Ministero della educazione nazionale. Catalogo delle cose d'arte e di antichità d' Italia), p. 444, with a reproduction of the portrait on p. 440.

Eyeglasses in Germany

Were eyeglasses known in Germany nearly sixty years before?[286] Certain lines in the *Legatus divinae pietatis* were written by St. Gertrude about 1302 or 1303, according to a scholar whose translation of them into French may be rendered as follows:[287]

> When a reader sees in a book writing so fine that it is difficult for him to read it, he takes one of those pairs of eyeglasses (paires de lunettes) which make writing look bigger, not because the writing itself in the book is changed, but as a result of the eyeglasses (lunettes).

Their use in Germany by 1303, however, is not proved by this excerpt from Gertrude's *Legatus*. For, in the first place, the passage occurs in Book I, which was composed not by but about Gertrude after her death,[288] believed to have occurred in 1302 or 1303. Secondly, the Latin text[289] has nothing corresponding to the French translator's "paires." Lastly, "lunettes" is not an equivalent of "berillum," which, according to the Latin text, made thin (exilem) writing look thicker (grassior), and hence was probably a piece of beryl used as a magnifying glass.[290]

Instead of "berillum," "speculum" (mirror) was the reading in the first Latin edition.[291] This was based on a single Latin MS con-

285 *Clin. oculist., Palermo,* 1907, *8,* 2990 (but "1352" on p. 2989); *Atti Accad. Padova,* 1922-23, *39,* 233; *Ann. Ottalm.,* 1923, *51,* 684; 1924, *52,* 276; same error in Müller, *Die Brille,* p. 12. The painting was mistakenly assigned to 1358 by Trestelle (Giulio Martinez), *Boll. Ass. ottica ital.,* 1941, *15,* 9.

286 John Peckham (+ 1292), archbishop of Canterbury, did not mention eyeglasses in his *Perspectiva communis;* its date of composition, however, is not known. What was the basis of Alexander von Humboldt's assertion (*Kosmos,* Stuttgart, Tübingen, 1845-62, vol. 2, p. 508) that "eyeglasses were known in Haarlem from the beginning of the fourteenth century"?

287 Matrod, Henri. Sur Roger Bacon. *Etudes franciscaines,* 1927, *39,* 236.

288 *Revelationes Gertrudianae ac Mechtildianae.* Poitiers, Paris, 1875-77, vol. 1, p. xxi; *Rivista storica benedettina,* 1924, *15,* 257.

289 *Revelationes,* vol. 1, p. 53.

290 A contemporary of Gertrude, the mystical philosopher Dietrich, talked about "those who see through beryl and similar things (per berillum et similia)." Krebs, Engelbert. Meister Dietrich. *Beiträge zur Geschichte der Philosophie des Mittelalters.* 1906, *5:5-6,* 51, 193*. In his *De radialibus impressionibus,* part 1, chapter 9, Dietrich mentioned the "rock crystal, which they call beryl (lapide cristallino, quem berillum vocant)." Venturi, Giovanni Battista. *Commentarj sopra la storia e le teorie dell' ottica.* Bologna, 1814, p. 154. In the thirteenth century a German poet spoke of the magnifying power of "berillus," a crystal rock (*Z. ophthal. Opt.,* 1923, *11,* 66, 99), and Roger Bacon, harking back to the burning glass of antiquity, said: "If a spherical crystal, which is called 'berillus,' or a round glass vase full of water is put in the path of the sun's rays, combustion occurs." *Communia naturalium,* ed. Robert Steele, book 1, part 1, distinction 2, chapter 5. *Opera hactenus inedita,* London, Oxford, 1905- . Vol. 2, p. 31.6-8. In the fifteenth century Nicholas of Cusa in his *De beryllo* defined beryl as a "bright, clear and transparent stone, to which a concave as well as a convex form is given; by looking through it you reach what was previously invisible." These examples, illustrating the usage of almost two hundred years, provide no support for Hirschberg's statement (*Mitt. Gesch. Med. Naturw.,* 1907, *6,* 223) that both crystal and glass were called "berillus." Confusion concerning the meaning of this term should be particularly avoided, since the German and Dutch languages both derive their word for "eyeglasses" from it; see Ten Doesschate, G. Some historical notes on spectacles and on beryllus. *Brit. J. Ophthal.,* 1946, *30,* 661.

291 *Insinuationum divinae pietatis libri quinque.* Cologne, 1536, fol. F3*v*.

taining only fragments of Book I. An available German translation of the original Latin, however, permitted the publication of Book I in a fresh Latin version.[292] Its choice of "speculum" suggests that the German term was "Spiegel." This word, being derived from "speculum," ordinarily meant "mirror." Yet it was sometimes used in the sense of "eyeglasses." Had it been so understood by the author of the sixteenth-century Latin version of Book I, would he not have equated it with some such word as "ocularia"? Instead, his selection of "speculum" (which never denoted "eyeglasses") shows that he at any rate thought the device mentioned in the *Legatus* as a means of enlarging fine writing to make it legible was, not a pair of eyeglasses, but a mirror.

Did a German poet discuss eyeglasses in the thirteenth century, decades before Gertrude's *Legatus*? According to Bock, "it is specifically stated by Missner (Meissner, 1260-1280) that old people used eyeglasses."[293] But if this Minnesinger ceased writing by 1280, he would have needed more than poetic talent to see eyeglasses widely adopted at least six years before they were invented. The claim that he did so rests on certain verses,[294] which may be translated prosaically as follows, without any attempt to reproduce the intricate pattern of their rimes:

> When old age dims our sight all too much, so that we cannot see fine writting well any more, then we turn to a light, clear "Spiegel," which can clarify the writing for us and make it quite legible, if we look at it through the "Spiegel."

"Spiegel" here means "eyeglasses," said the *Deutsches Wörterbuch* when it reached "Spi-" in 1903. Its magisterial authority was later challenged by Von Rohr,[295] who pointed out that the poet uses "Spiegel" in the singular.[296] (By contrast, "occhiali"[297] in Giordano

292 *Revelationes*, vol. 1, pp. xlix, lxxi.

293 *Die Brille und ihre Geschichte*, p. 8, cf. p. 54. Bock accepted the interpretation put forward previously by Horner, *Neujahrsblatt . . . des Waisenhauses in Zürich*, 1885, *48*, 11.

294 Hagen, Friedrich Heinrich von der. *Minnesinger*. Leipzig, 1838-56, vol. 2, p. 224. *Die grosse Heidelberger Liederhandschrift*, ed. Fridrich Pfaff. Heidelberg, 1899- 1909, col. 1118.

295 Reversing his previous stand (*Naturwissenschaften*, 1919, *7*, 210).

296 *ZentZtg Opt. Mech.*, 1920, *41*, 394. Von Rohr confused our poet (the elder Meissner) with a later Minnesinger, Heinrich von Meissen (the younger Meissner, c. 1250-1318), who praised women in his verse and hence was called "Frauenlob"; see this entry in the *Allgemeine Deutsche biographie* (Leipzig, Munich, 1875-1912).

297 Ronchi (*Galileo e il cannocchiale*, p. 38; *Rivista di oftalmologia*, 1946, *1*, 143; *Atti d. fond. G. Ronchi*, 1947, 2, 4; *Occhi e occhiali*, p. 3; *Storia della luce*, 2d ed., p. 53; La Luce, in *Le opere e i giorni della creazione*, Rome, 1953, p. 39) asserts that the Italian word for eyeglasses during the first three centuries of their existence was "lenti," and that this term was discarded at the beginning of the seventeenth century. Actually it first came into use then.

and Franco Sacchetti, "occlalium" and "ochialium" in the MS archives, "ocularia" in the *Chronicle* and Giovanni da San Gimignano, "ocularibus" in Petrarch, and "ocularios" in Guy de Chauliac are all, whether Italian[298] or Latin, in the plural.)[299] Meissner's singular "Spiegel" was interpreted by Von Rohr as "a sort of hand-glass, which was held over the writing. 'It clarifies the writing, which we examine in it' (in ihm)." This is a misquotation, however, since Meissner said, not "in it," but "through it" (dur in; durch ihn, in modern German). From our point of view "through" seems applicable to the *Wörterbuch's* eyeglasses as well as to Von Rohr's hand-glass. But Meissner's whole poem was an elaborate religious simile comparing the "Spiegel's" power to revive the sight of the aged with Mary's restoration of sinners to grace. Was the Minnesinger perhaps echoing the famous line in the New Testament: "For now we see through a glass, darkly" (1 Corinthians 13:12)? The original Greek (di' esoptrou) and the Latin translation (per speculum) both said "through," not "in"; and the dark "glass" was surely an imperfect mirror. Moreover, when Meissner calls Mary "Spiegel lichte" (bright as a "Spiegel"), does that description not suit a reflecting mirror[300] better than transparent eyeglasses or a hand-glass held over writing?

The foregoing asserted references to eyeglasses in Germany, then, both turn out on examination to involve either a magnifying glass or a mirror. But Feldhaus, tacitly assuming that the *Wörterbuch* and Bock had correctly interpreted Meissner's use of "Spiegel,"[301] triumphantly proclaimed it the earliest report of eyeglasses.[302] He therefore felt justified in denying the Italians any share in the invention (which of course by implication would pass to the Germans). He was not the first scholarly patriot who sought to snatch this achievement from Italy. Eyeglasses (and much more) had been found in the writings of Roger Bacon by a fellow-Englishman,[303] and the invention had been credited to the Walloons

298 Dante did not mention eyeglasses, despite Garrison, *Introduction to the history of medicine*, 4th ed., p. 185.

299 In Jean Brisebarre's poem of 1327, *Escole de foy* (*Histoire littéraire de la France*, vol. 36, Paris, 1927, p. 46), "un bericle" was equated with "eyeglasses" by Reis (*Folia ophthal. orient.*, 1932-34, *1*, 400), perhaps because the poet says he wishes to apply "un bericle" to the eyes. But why assume to both eyes at once? Other fourteenth-century examples of "bericle" in the singular unmistakably refer to a single lens in a frame, which may be equipped with a handle; cf. Laborde, Léon de *Notice des émaux, bijoux et objets divers*. Paris, 1853, vol. 2, p. 163.

300 Giordano similarly compares angels with "unstained, bright, shining mirrors" (specchi; *Genesi*, ed. 1830, p. 34; cf. p. 46; ed. 1839, p. 38; cf. p. 51).

301 *GeschBl. Tech. Industr.*, 1919, *6*, 245.

302 *Kulturgeschichte der Technik* (Mathematisch-naturwissenschaftlich-technische Bücherei, vol. 20-21). Berlin, 1928, vol. 1, p. 97. *Technik der antike*, p. 305.

by "Caesemaeker." But these two predecessors had at least somehow disposed of the Pisan *Chronicle*, whose very existence was not known to Feldhaus. Ignorance of fundamental documentary sources permits the drawing of facile conclusions, which inflate national self-esteem while obstructing the spread of the truth.

Spina's Ingenuity

Feldhaus' complete unawareness of the *Chronicle* may serve as a useful reminder that we have not yet considered the last two sentences of its account of Spina (p. 477):

> He knew singing, writing, illumination of MSS and everything which mechanically skillful hands can do. Ingenious in corporeal things, by his ingenuity he made himself a room in the house of the Eternal King.

For the benefit of his fellow-countrymen Del Lungo printed a literal Italian translation of the entire Spina passage, except the closing sentence, which he left in the original Latin. Despite his extraordinary erudition he candidly confessed (p. 6) that he would not know how to render the concluding remark. Did his difficulty arise because he accepted Bonaini's faulty reading "choralibus" rather than Redi's correct version "corporalibus"?[304] If adopted, "choralibus" would make the sentence say: "Ingenious in choir affairs, by his ingenuity he made himself a room. . . ." But the chronicler, I submit, carefully constructed a metaphor comparing Spina to a carpenter: "Ingenious in corporeal things, by his ingenuity he made himself a room (mansionem) in the house of the Eternal King." This comparison was clearly intended to recall the saying of another carpenter: "In my Father's house there are many rooms" (mansiones; John 14:2).[304.1] Since the annalist, as we already know, reworded what he found in the *Chronicle*, it would now be

303 William Molyneux. His *Dioptrica nova* was published in 1692, not 1622, as in Albertotti, 1922, p. 93, who here, in *Atti Accad. Padova*, 1922-23, *39*, 234, and in *Ann. Ottalm.*, 1923, *51*, 684, uncritically repeated Hirschberg's erroneous statement (vol. 13, p. 275) that Robert Smith upheld Molyneux. This misstatement was echoed also by Greeff (*Erfindung*, p. 58), Cirincione (*Ann. Ottalm.*, 1927, *55*, 934, 939) and D'Amico (*La filotecnica*, 1933, *3*, 196). Actually Smith refuted Molyneux thoroughly; see Rosen, *Arch. int. Hist. Sci.*, 1954 *7*, 4-5. Hirschberg's discussion of the history of eyeglasses occupies only a small part of the second volume (published in 1908, not 1906, as in Albertotti, 1914, pp. 329, 340) of his vast *Geschichte der Augenheilkunde*, mistitled "Geschichte der Brillen" by Albertotti, 1922, p. 104, who was called a "most accurate bibliographer" by Del Lungo, p. 39. Despite Pagnini (*Rassegna nazionale*, 1917, *39*, March-April, p. 264), the attribution of the invention of eyeglasses to Roger Bacon was not refuted by Manni, who on the contrary believed Bacon to have been familiar with the telescope (*De florentinis inventis*, p. 44).

304 *Opere*, vol. 2, p. 260. Canovai (*Memorie*, vol. 2, p. 243) also read "choralibus."

304.1 This utterance was equally familiar to one of the authors of the *Necrology* of S. Maria Novella. Of the many friars who died in the plague of 1348, he said that "they now inhabit rooms in heaven," and he described another Dominican as "happy now, dwelling in one of the Father's rooms" (Orlandi, *Necrologio*, vol. 1, p. 125.9-10, 127.5-6).

opportune to review his paraphrase of the *Chronicle's* last two sentences about Spina:

> He sang melodiously, wrote elegantly and decorated the handwritten books which are called "illuminated manuscripts." In short, there was none of the manual arts that he did not know (*Chronicle*, p. 477).

The annalist mentions Spina's ability to sing, but does not describe him as "ingenious in choir affairs." On the other hand, the annalist's statement "there was none of the manual arts that he did not know" matches the chronicler's remark that Spina knew "everything which mechanically skillful hands can do." It is this last trait, I submit, which is summed up in the words "ingenious in corporeal things." Ingenuity in manipulating physical materials, not harmonies or melodies, was required of the self-taught second maker of eyeglasses. The *Chronicle* reports many of his fellow-friars to be good singers, and frequently mentions the choir. Hence it is not surprising that Bonaini misinterpreted the abbreviated form (corlib$\overset{a}{5}$) in the *Chronicle* as "choralibus."[305] But Redi's reading "corporalibus" is unquestionably right.[306] It became extensively diffused not only through the numerous editions of his *Lettera* but also through its quotation in a widely consulted guide to medieval and modern writings in Latin.[307] Nevertheless it somehow escaped Del Lungo's attention. Had he noticed it, I feel confident it would have solved his problem. For he would have recognized that Friar No. 224, described by the *Chronicle* (p. 553) as "ingenious in manual operations (in operibus manualibus ingeniosus)," followed in the footsteps of Friar No. 113, Spina, who was "ingenious in corporeal things (ingeniosus in corporalibus)."

[305] Bonaini had little to guide him, for the word "choralibus" does not appear anywhere in the *Chronicle*. On the other hand, "corporali" occurs twice, but it is written "co$\overset{r}{p}\overset{r}{p}$ali" (fol. 30*r*) and "co$\overset{r}{p}$orali" (fol. 36*r*). Many other misreadings of the *Chronicle* by Bonaini were corrected by Barsotti, Riccardo. I manoscritti della "Cronica" e degli "Annales" del convento domenicano di S. Caterina di Pisa. *Memorie domenicane*, 1928, *45*, 368-373. Barsotti also discovered (pp. 216-217) why Redi was at first mistaken about the *Chronicle* and *Annals;* he was misinformed by Giovanni Pagni, a professor of medicine at the University of Pisa. I am grateful to the Dominican College Library of Washington, D. C., for an opportunity to examine this volume of the *Memorie domenicane*.

[306] Apart from all other considerations, the absence of the letter "h" from the *Chronicle's* "corlib$\overset{a}{5}$" is decisive. The *Chronicle* uses the word "corpus" 30 times (once as "corporis," once as "corporum," ten times as "corpus" and eighteen times as "corpore"), "corpusculo" once, and "corporali" twice, always of course without an "h." On the other hand, in the 23 occurrences of "chorus" (once in that form, twice as "choris," seven times as "chorum" and thirteen times as "choro"), except on fol. 28*r*, where "coɾx" is presumably a slip of the pen, the "h" is always present.

[307] Fabricius, John Albert. *Bibliotheca latina mediae et infimae aetatis*. Hamburg, 1734-46, vol. 1, p. 475, s.v. Bartholomaeus de S. Concordio, quoting from Spon, p. 215. The reading "corporalibus" was reproduced also in Manni, *De florentinis inventis*, p. 53, and Nelli, p. 152.

Should anyone doubt that "corporalibus" could bear the meaning assigned to it above, let him recall Seneca's dichotomy (*Epistles*, vi.58.14): "Whatever exists I divide into these categories, corporeal or incorporeal. There is no third [category]." The incorporeal Holy Ghost descended in corporeal form (corporali specie) as a dove (Luke 3:22). The standard textbook of Roman law supplied a definition and some examples: "Certain things are corporeal, others incorporeal. Corporeal are those which can be touched, like real estate, man, clothes, gold, silver and in short countless other things."[308] These tangible objects, I believe, include the various materials which the chronicler had in mind when he wrote that Spina was "ingenious in corporeal things." A parallel development in Italian is exemplified by Giordano's references to "this whole physical (corporale) world" and "these visible physical (corporali) things" (Manni-Biscioni, pp. 270-271).

Were Eyeglasses Invented in Venice?

If Spina, the second maker of eyeglasses, was "ingenious in corporeal things," what sort of man was the inventor? The search for information about this elusive person led in due course to the greatest center of the medieval glass industry, Venice. The regulations of the Venetian guild of crystal-workers, when promulgated in 1284, provided that "nobody in our guild shall dare to work colorless glass counterfeiting crystal," and that "work in crystal must be sold as crystal, and work in glass as glass."[309] A supplementary rule, dated 2 April 1300, ordered that

308 Gaius, *Institutes*, ii.12-13.

309 *I capitolari delle arti veneziane* (Istituto storico italiano. Fonti per la storia d'Italia, vol. 26-28). Edd. Giovanni Monticolo and Enrico Besta, Rome, 1896-1914. Vol. 3 (cited hereafter as "Capitolari"), p. 124.1-2, p. 127.4-6. For his translation into German of these regulations governing crystal-workers (only one of whose products was spectacles) Greeff chose the inappropriate title "Eine venetianische Brillenmacherordnung aus den Jahren 1284-1317" (*Dtsch. opt. Wschr.*, 1922, *8*, 600). In two of his sub-titles (pp. 620, 639) he put the wrong year "1288" instead of "1284." The preamble to the regulations says they were adopted in "1284, the twelfth indiction, in the month of November," without specifying the day of the month. But Greeff (p. 620) attached "twelfth" to "November," thereby separating the numeral from "indiction," in conjunction with which it designated 1284 as the twelfth year in a recurring cycle of fifteen years. Article 53 of the regulations, adopted in "1317, the fifteenth indiction, in the month of March," was similarly misdated "15 March 1317" by Greeff (p. 642). When the regulations numbered the day of the month as well as the indiction, Greeff could not misinterpret them in this way. Being resourceful, however, he found a different misinterpretation. Thus, an article adopted on "2 April 1300, the thirteenth indiction," he called (p. 640) "Article 13," although actually it is "Article 40." An article adopted on "15 June 1301, the fourteenth indiction," he likewise called (p. 640) "Article 14," although actually it is "Article 43." The regulations were re-issued in January (Venetian style) of "1318, the second indiction," which was called the "second article" by Greeff (p. 825; Eine zweite venetianische Brillenmacherordnung vom Jahre 1319-1330). In other passages, apparently out of sheer desperation, he simply abandoned the effort to translate "indiction," which he had defined correctly on p. 620.

nobody in the said guild of crystal workers shall dare to buy, or cause to be bought, or sell, or cause to be sold, any work in colorless glass which counterfeits crystal;[310] for example, buttons, handles, disks for small barrels and for the eyes, plates for altar pictures and for crosses, and stones for reading; the penalty shall be ten lire and confiscation of the work, which shall be broken.[311]

This supplementary rule was written in Latin (of a sort), and the words translated above as "disks . . . for the eyes" are "roidi . . . da ogli." Evidently "ogli" was the local syncopation of "oculi" (Latin for "eyes"),[312] but the lexicon of that language knows no "roidi." Fortunately the guild regulations, when re-issued in 1319 in the Venetian dialect, referred to "rodoli da ogli" (*Capitolari*, p. 141.5). Dialectal "rodoli" means "round objects"; and "roidi," although not recorded by Venetian lexicographers, was obviously a variant (with the last two consonants interchanged and the "l" vocalized?). In any case, "roidi . . . da ogli" in the provision adopted on 2 April 1300, some fourteen years after the invention, is the oldest known occurrence of any term for eyeglasses.

Two other designations in somewhat better Latin occur in later portions of the *Capitolari*. "Any person wishing to make glasses for the eyes for reading (vitreos ab oculis ad legendum)" on 15 June 1301 was authorized to do so, provided "he first comes to the

310 Greeff (*Erfindung*, p. 92) maintained that "crystal" means "glass." In that case, what would be the sense of these repeated prohibitions? Their purpose was misunderstood by Garrison, who relied on Greeff and failed to recognize his serious shortcomings. *Introduction to the history of medicine*, 4th ed., p. 185. The difference between the two materials may be exemplified by the *Chronicle* (pp. 500, 538); one friar went "to Venice to have a large cross made of rock crystal (lapide cristallino)," while another produced "glass windows (fenestras vitreas)." Nevertheless Greeff insisted again and again (*Dtsch. opt. Wschr.*, 1922, *8*, 600, 640) that "in this connection one must not think of rock crystal, but we know that good Venetian glass was called 'crystal.'" How much he knew about such matters is shown by Article 3 which, as translated by him (p. 620), forbade the "transformation of white, counterfeited glass into crystal or emery or tripolitanian color," whereas actually this article prohibited the "working of colorless glass by means of emery and tripoli to counterfeit crystal." Article 13, which commanded "all men working with glass in our guild similarly to sell work in crystal as crystal and work in glass as glass," was translated by him: "All who work in our trade similarly are required . . ." (p. 621). Similarly to whom? By omitting the qualification "men working with glass," Greeff made Article 13 pointless, for it extended to glass-workers the provisions previously applied to crystal-workers; and to be consistent, he butchered Article 10 of the 1319 code in the same way. Article 49 of this code prohibited the manufacture of imitation gems made entirely of glass (dople tutte de vero; cf. *Capitolari*, vol. 1, p. 117); Greeff failed to recognize the nature of these products, which he vaguely called "duplicates" (of what?), and he twice omitted "entirely" (tutte), thereby changing a command to use some crystal into a complete prohibition of glass. Where Article 25 of the 1319 code says: "If anybody in this guild buys crystal, in Venice as well as outside, or imports it or receives it as a gift from outside," Greeff's translation (p. 853) characteristically omitted the clause concerning importation. But rock crystal from the outside world was welcomed by Venice, whereas it exported, not imported, glass.

311 *Capitolari*, p. 133.5-10; facsimile in Albertotti, 1914, p. 347, and in *Int. ophthal. Congr.*, XII, St Petersburg, 1914, vol. 1, p. 153. Exactly the same articles were listed in the following section, which forbade the purchase of such counterfeit items for resale in Venice or for export.

312 By itself "ogli" did not mean "spectacles," despite Garrison, 4th ed., p. 185.

magistrates' office to swear he will sell that glass as glass."[313] Although non-members of the guild were forbidden to manufacture any product under its jurisdiction, in 1317[314] permission was granted to "Francesco, son of the late surgeon Niccolò, to make spectacles of glass (oglarios de vitro) and sell them in Venice, the present regulations notwithstanding."[315] These "oglarios de vitro," like Guy de Chauliac's "ocularios vitri,"[316] are masculine in gender, while the *Chronicle's* "ocularia" are neuter. Whether masculine or neuter, this noun became the standard Latin term for eyeglasses. And just as "vitreos" failed to be accepted in Latin, so "roidi" ("rodoli") dropped out of the vernacular. There Giordano's "occhiali," corresponding closely to Latin "ocularii," emerged victorious in the Venetian dialect as well as in Italian.

According to the editor of the *Capitolari* (p. 133, n. 3), in the regulation of 2 April 1300 "roidi" meant "flat pieces of glass in a circular, elliptical or similar form" (in other words, thin lenses). But the Venetian dialect applies "rodoli" (of which "roidi" was a variant) mainly to objects having a cylindrical shape. The same is true of Latin "rotuli" (from which "rodoli" is derived) and Italian "rotoli" (to which it corresponds).[316.1] Similarly, "roll" in English denoted the medieval scroll, a cylinder. Roger Bacon's *Perspectiva* and *Opus maius* had claimed that letters could be seen better and larger when viewed through less than half a sphere of glass.[317] These writings of his were in circulation some twenty years

313 *Capitolari*, p. 134.9-14; facsimile in Albertotti, 1914, 348. In the *Monografia della vetraria veneziana e muranese* (Venice, 1874), written jointly by Cecchetti, Vincenzo Zanetti and Eugenio Sanfermo, Cecchetti said (pp. 12-13) that the Venetian government finally permitted spectacles to be made of glass. Actually such manufacture was never prohibited, and sales were never restricted to spectacles made of crystal, despite Petella (*Ann. Med. nav. colon.*, 1901, *7:1*, 835). It was only misrepresentation that was banned, that is, pretending that the material used in finished products, including spectacles, was crystal when in fact it was glass. Yet Greeff (*Dtsch. opt. Wschr.*, 1922, *8*, 601), maintaining that "ordinary white glass could not be used for spectacles," to support his statement cited Articles 3, 13, 40 and 41, none of which contains any such prohibition; and the oath in Article 43 ("to swear he will sell that glass as glass") he distorted as follows: "to swear he will use only good crystal glass for spectacles" (p. 601).

314 Not "1300," as in Greeff, *Erfindung*, p. 93.

315 *Capitolari*, p. 138.1-5; facsimile in Albertotti, 1914, p. 349. The editor of the *Capitolari* misunderstood "Francisco condam magistri Nicolai cirurgici" to mean that Francesco was a surgeon. This blunder was originally committed by Cecchetti (*Atti Ist. veneto*, 1871-72, series 4, *1*, 1693). But Greeff easily wins the prize for amassing the largest number of mistakes in connection with this article, which he translated as follows: the authorities "thank Francesco, the late surgeon of master Niccolò, for producing eyeglasses and selling them in Venice in the presence of the chapter president who did not object" (*Dtsch. opt. Wschr.*, 1922, *8*, 642; cf. *Erfindung*, p. 93).

316 See n. 273, above.

316.1 Ovio (*Storia dell' oculistica*, p. 229) equates Venetian "roidi" with Italian "ruote," the dialectal equivalent of which was "rue."

317 Rosen, *Arch. int. Hist. Sci.*, 1954, *7*, 4, 7.

before eyeglasses were invented.[318] If Bacon's idea influenced the invention, perhaps it was these lesser segments of a sphere that were called "roidi da ogli" before the glass was thinned down and its curvature flattened out.

Besides "disks . . . for the eyes," the regulation of 2 April 1300 mentioned "stones for reading" (lapides ad legendum; *Capitolari*, p. 133.9). The equivalent in Venetian (*Capitolari*, p. 141.2) was "pere da lezer"[319] (Italian "pietre da leggere"). Both these expressions (lapides ad legendum, pere da lezer) were equated by the editor of the *Capitolari* with Italian "lenti," a word which ordinarily refers to the lenses used in eyeglasses. But Albertotti was surely right in emphasizing the distinction drawn by the guild between "roidi da ogli" (eyeglasses) and "lapides ad legendum" (magnifying glasses).[320]

In the regulation of 2 April 1300 eyeglasses were inconspicuously listed among seven items as the second member of a pair: "disks for small barrels and for the eyes."[321] A little over a year later, however, on 15 June 1301, "any person wishing to make glasses for the eyes for reading" was authorized to do so by a special rule, cited above, which was devoted exclusively to eyeglasses. Does this change from relative unimportance in April, 1300, to separate consideration in June, 1301, indicate that in those fourteen months Venice felt a growing demand for the new aids to vision? The special rule of 1301 concerning them was repeated intact (*Capitolari*, p. 141.5-9) in the code of 1319, where every single item listed in the general regulation of 2 April 1300 was re-enumerated, with the significant exception of eyeglasses (*Capitolari*, p. 133.7-9, p. 141.1-2). And the code of 1319 specified only two products when

[318] Bacon's *Opus maius* was not written in 1276, despite Barck (*St Louis med. Rev.*, 1904, *49*, 306; *Open court*, 1907, *21*, 212), Landolt (*Hygiène, Paris*, 1912, *3*, *August*, p. 14), Smith (*Med. J. Aust.*, 1928, *15*:2, 579, 585), Thompson (*Connoisseur*, 1934, *94*, 232), Gordon (*J. med. Soc. N. J.*, 1951, *48*, 5) and MacCallan (*Med. World, Lond.*, 1951, *74*, 167). This erroneous date was used also by Müller, who said (*Die Brille*, p. 6) that in 1276 Bacon mentioned his invention of eyeglasses, which were not invented until 1285 (p. 8). Eyeglasses were not invented in the sixteenth century by Bacon (a confusion of Roger with Francis?), despite Ramaugé, Anatole. *Considérations historiques et pratiques sur les progrès de l'ophthalmologie*. Thesis, Faculty of Medicine, Paris, 1836, no. 305, p. 9.

[319] This expression does not occur in 1300, despite Albertotti, *Soc. ital. di oftalmologia, Atti del Congresso 1924*, p. 93.

[320] 1922, pp. 87, 93; yet on p. 94 he himself explained "lapides ad legendum" and "pere da lezer" as "lenti," without specifying that he meant "lenti d'ingrandimento" (magnifying glasses). Petella mistakenly equated "lapides ad legendum" as well as "roidi da ogli" with eyeglasses. *Ann. Med. nav. colon.*, 1901, *7*:1, 835.

[321] This linkage (roidi de botacelis et da ogli) may help those familiar with medieval Venetian cooperage to clarify the meaning of "roidi." This term does not appear in the regulations of the coopers' guilds, where small barrels are mentioned frequently (e.g., *Capitolari*, vol. 2, pp. 421-423; vol. 3, p. 89). Buttons and barrels and casks (botoni, botazzi, botaceli) were perhaps the same as bottles, said Greeff (*Dtsch. opt. Wschr.*, 1922, *8*, 640).

it rephrased the section prohibiting the working of glass to counterfeit crystal:

> everybody in this guild who works in glass, that is, imitation gems and disks for the eyes for reading (rodoli da lezer de ogli) is required and obliged to sell work in crystal as crystal and work in glass as glass (*Capitolari*, p. 140.3-6).

The guild regulations give us these few tantalizing glimpses of how the manufacture of "disks of glass for the eyes for reading" (rodoli de vero da ogli per lezer; *Capitolari*, p. 141.6) developed at Venice in the first two decades of the fourteenth century.

In 1914 (pp. 339, 348) Albertotti drew the conclusion that

> there [in Venice] this art of making eyeglasses was known long before [1300][322] and was almost ancient (quasi antica), because an art which is falsified is an art that has evolved.

In a sermon preached on 19 July 1304 Giordano said (Moreni, vol. 1, p. 172):

> All the arts are falsified today. From the greatest to the smallest, there are a hundred falsifications in each. Even in the shoemaker's art, which is so cheap, there are a hundred falsifications. All the arts today are counterfeited and falsified.

The misrepresentation of glass objects as crystal had been prohibited by the guild regulations of 1284 (before eyeglasses were invented).[323] But in 1914 Albertotti was not aware of this rule. When he found out about it (1922, p. 86), he had to modify his earlier extravagant conclusion. For the provision of 1300, when compared with the regulations of 1284, shows that the counterfeiting of crystal was familiar to Venetians at least sixteen years before 1300. This comparison proves also that spectacles of crystal or glass or glass masquerading as crystal were made at Venice by 2 April 1300. How long before the turn of the century were they produced there? How were they introduced?

Albertotti (1922, p. 87) conjectured that Giordano knew the inventor at Venice,[324] or at least that the invention was made on

[322] Not "1301," as Albertotti said, for he was referring to the rule of 2 April 1300, quoted by himself on the preceding page. The same correction should be applied to Albertotti, *Atti Accad. Padova*, 1913-14, 30, 313, and to Davidsohn, vol. 4, part 2, p. 13.

[323] Hence "roidi da ogli" (and "lapides ad legendum") were not mentioned in the regulations of 1284, despite Sarton (*Isis*, 1923, 5, 499; *Introduction*, vol. 2, p. 1026), followed by Crombie, Alastair C. *Augustine to Galileo*. London, 1952, p. 206; cf. Albertotti, 1922, p. 86. Sarton's remark (*Introduction*, vol. 2, p. 1026) that "at Venice . . . documents relative to the manufacture of eyeglasses date back to the second half of the thirteenth century" should be restricted to the very end of that century.

[324] Recalling that the Dominicans had a monastery at Venice, Albertotti thought they owed their familiarity with the new invention to Spina, who owed his familiarity to them (1922, p. 85; p. 101, n. 9). Of these contradictory thoughts, the former would be in harmony with the sources and the historical probabilities.

the territory of the Venetian republic, which jealously guarded the secret. The inventor's uncommunicativeness would then be attributed to "the Venetian magistrates' watchful supervision of industrial and business affairs." As Albertotti developed this theme, in his eyes it gained in certainty. He soon spoke with assurance about the "unknown Venetian inventor."[325] "Recovery of an ancient Venetian glory" was the subtitle he chose for the offprint of this *Letter concerning the invention of eyeglasses*, published in 1922 on the occasion of the 700th anniversary of the renowned institution where he was then professor of ophthalmology, the University of Padua, the intellectual pride of the former Venetian republic.

Setting local allegiance aside, let us submit Albertotti's hypothesis to the supreme test of the sources. In the first place, since Giordano traveled widely, what particular reason is there to place his conversation with the inventor of eyeglasses in Venice or Venetian territory?[326] Secondly, did the republic guard the secret jealously when "any person wishing to make glasses for the eyes for reading" was authorized to do so on 15 June 1301,[327] only a little more than a year after they were first mentioned in the guild regulations?[328] Of Albertotti's hypothesis that the invention of eye-

[325] P. 94. Yet he called Spina, a Pisan, "inventor or re-inventor (rifacitore) of eyeglasses" (p. 91), and also denied that Spina was the inventor (pp. 85, 87, 94). At least one reader understood Albertotti to maintain (and prove!) "that the only inventor of eyeglasses was Alessandro della Spina" (Bourgeois, *Chron. méd.*, 1923 *30*, 198).

[326] This conclusion certainly could not be based on his reference to a "blazing fire, like that which heats glass" (*Genesi*, ed. 1830, p. 6; ed. 1839, p. 6).

[327] Albertotti himself pointed out (1922, p. 102) that eyeglasses were not a secret in 1301 (he said "1300," although he was referring to the rule of 15 June 1301, cited by himself twice in the preceding lines). According to Greeff (*Dtsch. opt. Wschr.*, 1922, *8*, 602), "the Council of Ten sought to keep the making of eyeglasses a secret as long as possible," and hence the name of the inventor is not known. Since all this supposed secrecy about eyeglasses finds absolutely no support in the sources, Greeff glibly guessed (p. 601) that the guild's members may have had to swear also to keep trade secrets; what they actually did swear, he misunderstood (see n. 313, above).

[328] According to Petella (*Ann. Med. nav. colon.*, 1922, *28:2*, 63), Giordano and Spina concealed the inventor's name "in order not to endanger his life and his relatives (the Council of Ten having condemned a transgressor to death)." For the error involved in supposing that Spina had anything to do with concealing the inventor's name, see n. 241, above. Petella also assumed that a glass-worker who left Venice around 1300 to follow his trade elsewhere faced the death penalty. In fact the punishment was that he could not resume his business if he returned to Venice or its territory; and in 1315 this prohibition was relaxed to permit resumption on payment of a fine. Cecchetti, Sulla storia dell' arte vetraria muranese. *Atti dell' Ateneo veneto*, 1865, series 2, 2, 146-147. But even if we grant Petella's melodramatic and unhistorical assumption of a death penalty, would the alert Venetian authorities have needed a public sermon by Giordano in Florence two decades after the event to learn the name of someone whom presumably they were relentlessly pursuing in the interval? According to Greeff (*Dtsch. opt. Wschr.*, 1922, *8*, 601), Venice saw to it "that no trained workers left." Yet he himself translated (p. 826) Article 11 of the 1319 code: "If any guild member living in Venice goes to Mestre or Treviso or any [other] place or city and imitates this craft, and afterwards returns to Venice, he shall not dare or presume to ply this trade in Venice unless he first pays 30 lire, 12½ soldi, and makes

glasses was Venetian,[329] the first part must be adjudged unproved, and the second part improbable.[330]

Who Invented Eyeglasses?

What do we know, then, about the inventor? It may be affirmed with certainty that he was not a Dominican, and with probability that he was not a cleric. He was definitely not a Florentine, and Pisa has a better claim on him than any other locality.[331] Why was he unwilling to share his invention?[332] Nelli (*Vita . . . di Galileo*, pp. 159-160) sought the explanation of his conduct, not in an anti-

up for all the damage" (essentially the same provision is contained in Article 14 of the 1284 code). For a fugitive worker the penalty was death, said Greeff (p. 602). Yet he himself tried to translate (p. 623) Article 26 of the 1284 code: "Every crystal-worker who in any way leaves (exiverit) Venice to ply his trade must unconditionally pay 50 lire." This amount was confused by Greeff with a different sum mentioned in the following article; and by failing to translate "exiverit," he eliminated the worker's right to leave Venice and ply his trade elsewhere if he made the required payment. In Greeff's version (without "exiverit") Article 26 becomes arrant nonsense: "If a glass-worker outside Venice wishes to ply his trade in any way, he must pay 5 soldi grossi." How could Venice force workers elsewhere to pay anything? On the basis of two cases in 1554 Greeff generalized (p. 601) about the centuries-long Venetian death penalty for runaway workers. Yet legal permission to leave and return was provided in the codes of 1284 and 1319. But why should mere historical sources be allowed to impede the development of a blood-curdling myth?

329 It may be called "Albertotti's hypothesis" because he marshalled arguments for it and gave it prominence. On the other hand, the bare suggestion itself is found elsewhere (e.g., Masson, *France méd.*, 1908, *55*, 201; Greeff, *Dtsch. opt. Wschr.*, 1922, *8*, 600, 602). The invention of eyeglasses was located in Venice also by Bruno, Vincenzo. *Teatro de gl' inventori di tutte le cose.* Naples, 1603, p. 183. He attributed it to a Regidio Persiano, otherwise unknown, on the authority of the "Fisonomia" of Vogherio, who for some reason fails to appear in his bibliography (fol. ++4*v*-6*r*). Discovering the name of the inventor of eyeglasses was, however, a mere trifle for Bruno, who knew that the inventor of glass itself was called Chiribide. The latter was discussed (said Bruno) by Eusebius, and also by Girolamo Cardano in the *De rerum varietate*. In Cardano's treatise I could find no such discussion, while Bruno somehow forgot to specify which work by which Eusebius discussed Chiribide, whose name he gives a few lines below as "Chysibide" and to whom he ascribes the invention of eyeglasses alternatively with "Persiano." According to Pliny (*Natural history*, 5, 75; 36, 190-191) glass was first made near a river whose source was a marsh called Cendebia or Candebia. Was this river-origin transformed into a glass-originator (Chiribide or Chysibide) by Bruno? Or had he perhaps heard that the glass industry at Venice used a material called "ciribiri"? Cecchetti, *Atti Ist. veneto*, 1871-72, series 4, *1*, 1797. In any case Bruno's whole pack of lies would not have been mentioned here had it not received Albertotti's respectful attention (1914, pp. 348-349). By "Vogherio" Bruno probably meant J. J. Wecker, whose *De secretis* was frequently published from 1559 on; while Eusebius of Caesarea in his *Praeparatio evangelica*, 10.6, listed inventions but said nothing about glass.

330 Absolutely false is Albertotti's assertion (*Soc. ital. di oftalmologia, Atti del Congresso 1924*, p. 93) that "all the oldest documents—literary and artistic—which mention eyeglasses agree in indicating Venetian territory as the place of their origin." Neither Giordano nor the *Chronicle* indicates a Venetian origin. Albertotti was so completely convinced by his own conjectures that he confused them with historical documents.

331 This is only a re-affirmation of the conclusion reached nearly three centuries ago by Dati, the first student of the subject (cf. n. 216, above). Yet one wonders how, with all his passionate devotion to his birthplace, Florence, he would have reacted to the Salvino swindle had he still been alive in 1684.

332 Apparently unfamiliar with the *Chronicle*, Ronchi supposed that the inventor discussed his invention "with friends and perhaps also with scholars." *Rivista di oftalmologia*, 1946, *1*, 132; *Atti d. fond. G. Ronchi*, 1947, *2*, 4; *Occhi e occhiali*, pp. 1-2.

social quirk of his character, nor in a fear of prosecution,[333] nor in the watchfulness of Venetian authorities, but in the spirit of private enterprise. The *Chronicle's* statement, Nelli argued, does not mean that he never showed his eyeglasses to anybody;[334] for in that case they would not have become known to Spina, who in turn would not have been assigned a predecessor by the chronicler. As a cloistered friar, Spina did not have to worry about supporting himself. But the inventor, a layman, declined to disclose his method because he wanted to profit by producing eyeglasses.[335]

333 His "secrecy might well have been based on a desire to avoid the dangers of charges of witchcraft." Jackson, Edward. Historic evolution and use of spectacles. *Amer. J. Ophthal.* 1927, series 3, *10*, 606. Had such been his state of mind, would he have refused "to communicate to anybody the art of making" eyeglasses, while allowing them to be seen?

334 As was supposed by Canovai (*Memorie*, vol. 2, p. 246). Hence it would be wrong to apply to the inventor of eyeglasses the words of V. Gordon Childe, *What is history?* (New York: Schuman, 1953), p. 13: "An invention that no one uses or knows of is not an historical event at all; if the new . . . process remains confined to the inventor's workshop . . ., it is historically negligible."

335 Nelli's suggestion of a mercenary motive was repeated in the *Biografia dei Pisani illustri* where, in the article about Spina, Menici said: "in the inventor's sordid heart the thirst for gold prevailed rather than the desire to make himself useful to others." Menici evidently saw an analogy in the conduct of Henning Brand, the discoverer of phosphorus. Leibniz, Gottfried Wilhelm. Historia inventionis phosphori. *Miscellanea berolinensia ad incrementum scientiarum.* 1710, *1*, 92-96; translation into German by Peters, Hermann. *Arch. Gesch. Naturw. Tech.* 1913, *4*, 196-203. Menici's eloquent denunciation of the selfish inventor did not stop him from illogically glorifying Spina as the inventor.

Notes and Queries

Edited by Dorothy M. Schullian, Ph.D.*

Retrospect and Prospect

This year this department celebrates, with the Journal, the beginning of the second decade of its existence. It is appropriately and traditionally a time for stock-taking, for self-examination in the light of the aims set forth by Max H. Fisch in Volume 1 (1946), page 171:

> The chief aim of the present department is to provide a medium of communication between readers with unsolved problems and readers who can solve them. It will also print historical and bibliographic notes, comments on articles published in the Journal, corrections of significant errors in standard histories of medicine and related sciences, suggestions of topics for investigation, announcements of work in progress, and other news of general interest.

In ten years much can happen. Since 1946 the publisher of the Journal, its Editor, and the editor of this department have changed. Undeniably though perhaps less perceptibly the range of this department has also changed. In some respects it has broadened, and certainly no chorus of vehement protests has been heard concerning the conduct of these pages. The present editor is troubled, however, that with less emphasis on the first aim mentioned above the very name of the department may be in danger of losing one half its validity.

It is an honored name because it connotes co-operation between scholars. It has an honored predecessor and companion in the British journal *Notes and Queries for Readers and Writers, Collectors and Librarians,* which was founded in 1849 and is now in the two hundredth volume of its publication. It has also predecessors and at least one companion whose vitality can scarcely be termed phenomenal. *Bibliographical Notes and Queries* had four short years of life in London from 1935 to 1939. *The Times Literary Supplement* for Friday, January 20, 1956, carrying a review of Volume 4, Nos. 3 and 4 of *The Book Collector,* mentioned that that journal's supply of Bibliographical Notes and Queries "shows how hard it is to get subscribers to contribute (a form of anaemia which killed the earlier periodical of that name)." And on the medico-historical side, we may recall Fielding Hudson Garrison's sad analysis in his *John Shaw Billings* (1915), page 226:

> In the first volume of the *Index Medicus* [1879], a special page of medical "Notes and Queries" is included at the end of each number, consisting of questions and answers bearing upon rare books and editions, and other recondite things in medical bibliography and history. A running fire of these was kept up for about a year, the principal contributors being Billings,

* Cleveland, Ohio.

Fletcher, and Mr. Thomas Windsor, but the clever idea not receiving the interest and support from the profession which it deserved, it was discontinued.

Absit omen, a word to the wise, etc. This department, while not lacking in material for publication, will always want from its readers notes, notes, and more notes; these have, it would seem, become gradually the chief aim. But it also wants at least a few *queries.* It no longer proposes to number them, as does our sister journal *Isis* in its department "Queries and Answers"; they will be inserted sporadically, as circumstances allow and recommend. But let them be queries which cannot easily be answered elsewhere. A historical or bibliographical fact which can be readily ascertained by a good reference librarian in a good medical library is not a legitimate subject of query for a department which aims to provide"a medium of communication between readers with unsolved problems and readers who can solve them." Send, please, your *genuine* queries, your notes, and, not least, your suggestions for the conduct of this section in the decade to come.

The Skull of Descartes

Descartes, who died on 2 February 1650 in Stockholm, was buried in a corner of the burial ground of Stockholm reserved for aliens. In 1666, in accordance with the wish of his friends, his remains were exhumed to be returned to France. Baillet[1] tells in detail how the Chevalier de Terlon, the French Ambassador, cut off at that time the forefinger of the right hand of Descartes "qui avoit servi d'instrument aux écrits immortels du Défunt." He had of course solemnly asked permission to do so.[2] He had also prepared a new coffin of copper, only two and a half feet long because he did not doubt that the skull was detached from the bones. The ceremonies of the return of Descartes' body and the long journey to France are described at length. The coffin stayed three months at Copenhagen, under Terlon's supervision; he changed its appearance to that of a bale of clothes for a more secure passage and preferred an overland route so that it should not fall into the hands of the English, among whom Descartes already had very many admirers ("Adorateurs") who would have liked to build for his ashes a splendid mausoleum. Finnally, early in January 1667, the coffin arrived at Paris and was first placed in a chapel of St. Paul there, whence it was taken with great pomp to the Abbey of St. Etienne-du-Mont. A tombstone with an elaborate epitaph in marble was set against the wall.

But Baillet is silent about the sordid story of Descartes' skull. It appears that Hanstrom, a captain in the Swedish Gardes who was present at the exhumation at Stockholm in 1666, cut off Descartes' head and exchanged it for another one. In 1821 Berzelius wrote to Cuvier offering this skull, which

1 Baillet, Adrien. *Vie de Monsieur Descartes,* Paris 1691, vol. II. p. 436.

2 Baillet, Adrien. P. 436: 'il avoit religieusement demandé à l'Assemblée, qui composoit presque toute l'Eglise catholique de Suède, en témoignage du zèle qu'il avoit pour conserver la mémoire de M. Descartes."

had the following inscription in Swedish: "Skull of Descartes, taken by Hanstrom in 1666, before the body was returned to France." Since then it has been in many collections: Hans Celsius, Haeger, Flycht, Sparmann, and Arngren. The last one paid for it Fr.37, a very small sum for the head that created the *Discours de la Méthode pour bien conduire sa Raison.*

Now to Descartes' body again. During the French Revolution the Abbey of St. Etienne-du-Mont was closed. The Convention wished to pay Descartes the honours of the Pantheon; the Directoire, however, rejected this decision. They considered Descartes "la principale cause des malheurs qui ont désolés l'espèce humaine." He had only to "vivre et mourir dans ses ouvrages." The demolition of the Abbey in 1807 caused the removal of the ashes of the philosopher to the "Champs Elyséens" of the Musée des Monuments Français, where they were placed by Alexandre Lenoir in an antique sarcophagus. The Musée closed down in 1816, and in 1819 Descartes' remains were reburied in the second apsidal chapel of St. Germain-des-Prés, next to Mabillon's tomb. A bust of Mabillon is outside on a wall of St. Germain-des-Prés; it can be seen from the terrace of the Deux Magots. In May 1937 the tombstone with the epitaph, believed lost, was discovered in the Dépôt des Oeuvres d'Art de la Ville de Paris," rue La Fontaine, and it was again placed at St. Etienne-du-Mont. It now has disappeared once more.[3]

In the end the "Académie des Sciences" accepted the offer of Berzelius of the skull of Descartes and it was received with a 'déférence religieuse,' to be sent without more ado to a museum. Some doubt as to the authenticity of the skull lingered on. Finally, in 1913, Dr. Paul Richer was entrusted with the task of clearing this question. By comparing the skull with different portraits of Descartes he came to the conclusion that it is indeed the authentic skull of the great man. It was placed in a glass case, and it is now in the Musée de l'Homme in the Palais de Chaillot, next to another glass case containing the skull of a criminal from the Collection Gall.

Public opinion in Italy demanded recently the return of the craniums of six members of the Medici family to their tombs (*J. Hist. Med.*, 1955, *10*, 431). Should not Descartes' skull return at long last to his body, resting at St. Germain-des-Prés?

E. Weil

Teeth of Colonial Americans

A book containing a passage which should be of special interest to the dental historian has recently been made available in a modern edition for

[3] The text of the epitaph is to be found in Baillet, II, pp. 443-44. At the end of 1947 I came across a copy of the first edition of Descartes, *Principia Philosophiae*, 1644, which came from the Library of the Abbey Ste. Geneviève at Paris, founded in 1624. In this copy someone who owned it in the later years of the seventeenth century had copied the epitaph from Descartes' monument. It corresponded exactly with the text given by Baillet. This volume is now in the Babson Institute Library, Babson Park, Mass.—see catalogue no. 49, pp. 27-28. I tried in vain to find the marble with the epitaph, and Descartes' bust, mentioned by Baillet. A very simple, small marble plaque is to be seen now in St. Germain-des-Prés over the tomb of Descartes.

the general public. Written in 1744, it remained in manuscript form until published in a limited de luxe edition in 1907.[1] It was republished in 1948 under the title *Gentleman's Progress; The Itinerarium of Dr. Alexander Hamilton.*[2]

"What manner of man was this unique doctor who refused 'to play the traveler,' and who so charmingly and intimately wrote an Inside the Colonies in 1744?"[3] asks the editor in his Introduction. He then replies as follows:

Alexander Hamilton was foreign enough to be interested in all aspects of the American colonies and yet sufficiently familiar with their civilization to look beyond the spectacular and the temporary and seize upon its fundamental and enduring traits. His birth, at or near Edinburgh in 1712, into the highly respected family of Dr. William Hamilton, Professor of Divinity and Principal of the University of Edinburgh, assured him a secure place in the Scottish gentry, who alone among aristocracies valued intellectual eminence equally with land and family connections.

The opening paragraph of the Introduction offers the following appraisal of the *Itinerarium.*

Dr. Alexander Hamilton's Itinerarium is one of the happiest combinations of liveliness, wit and instructive information written in colonial America. The description of his journey from Maryland to Maine and back in 1744 is unequalled by any other writer. As a rule travelers, like fishermen, think to enliven their accounts by fanciful invention, by embellishing the truth, by gross exaggeration of adventures encountered and hardships experienced—all for the amazement of contemporaries and the deluding of posterity. They traffic in the incredulous. The better the tale the greater the sale is their maxim. Not so with Dr. Alexander Hamilton. He is that seldom encountered person, the truthful traveler. Moreover his accurate and comprehensive reporting, to my knowledge unequalled in any other colonial travel account, enhances rather than detracts from the fascination of his narrative. In the cogent phrase of his day this veracious tourist was an original.[4]

But we are particularly interested here in what Dr. Hamilton has to say about teeth and gums. Of the Dutch whom he encountered in Albany, New York he wrote:

They are a healthy, long lived people, many in this city being in age near or above 100 years, and 80 is a common age. They are subject to rotten teeth and scorbutick gumms which, I suppose, is caused by the cold air and their constant diet of salt provisions in the winter, for in that season they are obliged to lay in as for a sea voyage, there being no stirring out of doors then for fear of never stirring again.[5]

Dr. Hamilton was on solid ground when he observed that their constant

[1] *Hamilton's Itinerarium* . . ., edited by Albert Bushnell Hart . . . St. Louis, Mo., printed only for private distribution by W. K. Bixby, 1907.

[2] [Hamilton, A.] *Gentleman's progress; The Itinerarium of Dr. Alexander Hamilton, 1744.* Edited with an introduction by Carl Bridenbaugh. (Published for the Institute of Early American History and Culture at Williamsburg, Va.) Chapel Hill, University of North Carolina Press, 1948. xxxii, 267 pp.

[3] *Ibid.*, p. xi.

[4] *Ibid.*, p. xi.

[5] *Ibid.*, p. 74.

diet of salt provisions for the winter was likely to cause scorbutic gums. Although it is admitted that we have a better understanding of the etiology and treatment of scurvy than did physicians in the mid-eighteenth century, we are about as much in the dark as ever concerning the cause, prevention, and cure of dental caries. And when Hamilton supposed that cold air was a factor in the cause of dental caries, he was concurring with the opinion of other writers of his time.

His statement has added significance in view of a recently published article in which are discussed similar reports by three other travelers in colonial America.[6] One of these travelers was something of a naturalist, the second an Abbé with Rochambeau's French forces fighting with the American Revolutionary Army, and the third, although neither physician nor dentist, a well-qualified botanist. Peter Kalm by name. All three of these observers deserve attention since each separately reported the shocking condition of the teeth which they had observed independently. But it is probably more significant that a well-trained physician should report a similar condition among people of European stock living in the same general region during the same historic period.

Throughout the *Itinerarium* are numerous comments concerning food and drink as well as other living habits of the people observed along Dr. Hamilton's route. In this connection the following quotation[7] may be of interest:

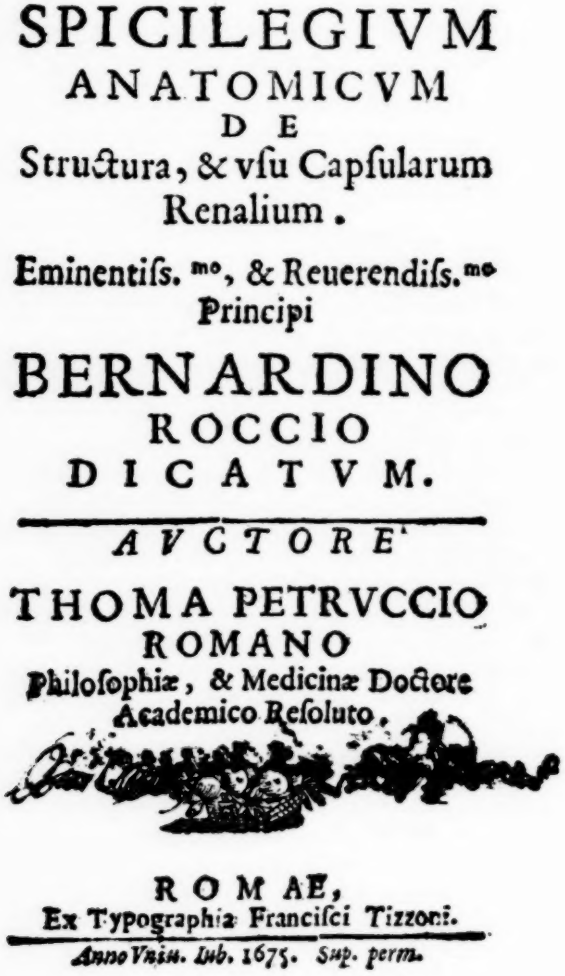
It is customary for modern dentists to recommend a balanced diet of coarse natural foods, low in carbohydrate and high in vitamin content. The diet of the Colonists was probably somewhat in line with this recommendation. Their diet was probably not unlike that of other settlers in this country from earliest times up to the latter part of the nineteenth century. According to Peter Kalm the inhabitants of Philadelphia shipped to the West Indies 'almost every day a quantity of flour, butter, meat, and other victuals.' One might assume that they also consumed some of the same kinds of food. Kalm states further that 'in return they received either sugar, molasses, rum, indigo, mahogany, and other goods or ready money.' Their staple foods were likely such items as whole-grain flour, butter, eggs, milk, meat, fish, fowl, and game. Meats were preserved by salting, pickling, drying, and smoking. Fresh meat, fish, fowl, and game were only available immediately following the killing of the animal. Vegetables were fresh in the summer and fall, and preserved mainly in cellars for the winter and spring. There was probably only a limited supply of fresh fruits and berries in the summer and fall and preserved ones for consumption in winter and spring. Storage and over-cooking may have destroyed much essential nutrient material. Certainly, there was less processing of milled grain, less refining of food in general, and practically no commercial preparation or preservation as we know it today. The generous use of pure crystalline sugar and refined white flour was not common until late in the nineteenth century. Yet apparently American Colonials suffered greatly from early loss of teeth.

[6] Anderson, Bert G., The teeth of Colonial Americans: as reported by three contemporary observers, *Yale J. Biol. Med.*, 1947, *19*, 909-922.

[7] *Ibid.*, pp. 921-22.

Dr. Hamilton's comments on the contemporary dietary of this country confirm the assumption made in the foregoing quotation concerning the type of foods consumed by these people. It seems significant that the four separate reports discussed here concur in the opinion that the teeth of the colonial Americans were very bad. They deserve a wider general medical audience, especially the attention of those who are concerned with dental caries and periodontal disease.

BERT G. ANDERSON


SPICILEGIVM
ANATOMICVM
DE
Structura, & vſu Capſularum
Renalium.

Eminentiſs.mo, & Reuerendiſs.mo
Principi

BERNARDINO
ROCCIO
DICATVM.

AVCTORE
THOMA PETRVCCIO
ROMANO
Philoſophiæ, & Medicinæ Doctore
Academico Reſoluto.

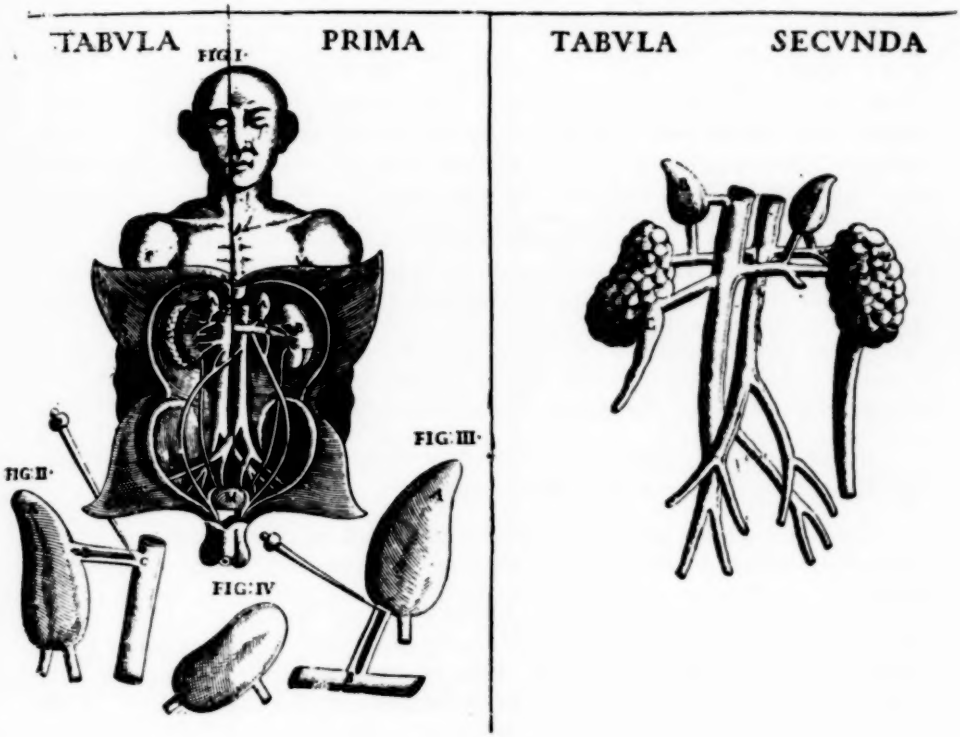
ROMAE,
Ex Typographia Franciſci Tizzoni.
Anno Vnio. Iub. 1675. Sup. perm.

Petruccius on the Adrenals

The little-known Roman physician, Thomas Petruccius, published at Rome in 1675 a remarkable little book on the structure and function of the adrenal capsules which contains an interesting, but somewhat inaccurate,

illustration of the glands showing their anatomical relation to the kidneys. A copy of the book, discovered by Mr. J. I. Davis of London, is now at the Yale Medical Library. It was known to Albrecht von Haller, who in his *Bibliotheca anatomica* (vol. 1, page 624) gives an unflattering description of it which runs as follows:

Plenus errorum. Arterias capsulares aorticas rejicit; valvulam esse in venae capsularis in venam cavam ingressu, quae non sinat eo sanguinem venire. Caveam in ea capsula renali admittit, & succum atro fuscum. Atram bilem per venam in eam caveam vult deponi, inde per arterias resumi, in renem venire, urinae adfundi, eam saturato colore tingere. Non bonae icones.



Petruccius' book, despite Haller's comment, has a number of virtues, perhaps the most important being that since the author is historically minded he gives due credit to all those prior to him, including Eustachius, Vesling, Thomas Bartholin, and others. He also included good bibliographical references to the descriptions in question, a rather unusual thing for a seventeenth century medical writer to do. Photographs of the title-page of this rare book and of the first and second plates are given herewith.

J. F. F.

Diseases of Books

For physicians and bibliophiles who read this journal the following passage from the fourth chapter of Richard de Bury's *Philobiblon,* already so well known, will bear repetition here. The complainants are the books themselves, and the passage is given in the translation of that eminent classicist and Princetonian Andrew Fleming West from the edition printed for The Grolier Club (1889, vol. 2, pp. 40-41):

Wherefore, we complain of our homes unjustly taken from us, and of our garments—not those that are not given, but those anciently given us, and now torn with violent hands. Our soul cleaveth unto the earth, our belly lieth on the ground, and our glory is smitten into dust. We labour with divers diseases, ailing in our back and sides. We lie with our limbs loosened by the palsy, and there is none to procure us a healing plaster. Our native whiteness, that shone like the light, is already turned brown and sallow, so that no physician would doubt that we were stricken with jaundice. Some of us are suffering from gout, as our distorted extremities evidently imply. The smoke and dust by which we are continually beset have dimmed the clearness of our visual rays, and have already brought ophthalmia on our bleared eyes. Our bellies are consumed by the sharp gripings of our bowels, which greedy worms cease not to destroy; yea, we endure the corruption of either Lazarus, and none is found who will anoint our sores with balm or call out on the fourth day to the stinking body, Lazarus! come forth! Our cruel wounds, which are wickedly inflicted on the innocent, are bound up by no healing remedy, nor is there any one to put a plaster on our sores; but ragged and shivering, we are thrown in our tears into dark corners, or, with holy Job, are seated on the dunghill, or, what seems too shameful to be told, are cast out of sight in the abysses of the sewers.

In the eighth chapter (pp. 69-70) the author relates the evils which may befall books which have been poorly stored:

Then the chests of the noblest monasteries were opened; cases were brought forth, and caskets were unlocked, and volumes that had slumbered long ages in their tombs awakened astonished and those that had lain hidden in places of darkness were overwhelmed with rays of new light. Books once almost dainty, but now become corrupted and disgusting, strewn over with the litters of mice and bored with the gnawings of worms, were lying about almost lifeless; and those that once were clothed in purple and fine linen, now prostrate in sackcloth and in ashes seemed given over to oblivion as habitations of moths. Nevertheless, seizing on every moment of leisure we sat down among them with greater pleasure than a dainty physician would have done amidst stores of spices, for there we found both the object and incitement of our love.

Such were the dangers in 1345. An excellent bibliography of insect enemies from ancient to modern times is available in Harry B. Weiss and Ralph H. Carruthers, *Insect Enemies of Books* (New York, The New York Public Library, 1945). The subject has proved of interest to an outstanding historian of medicine; see Ernest Wickersheimer, "Jean Hermann et les insectes ennemis des livres," *Libri,* 1952, 2, 88-98. For the treatment indicated,

see Genevieve Miller, "*Medicus Librorum:* Jean Eschmann, Restorer of Rare Books," in *Bulletin of the Cleveland Medical Library*, 1956, *3*, 3-8; Harry Miller Lydenberg and John Archer, *The Care and Repair of Books* (New York, The R. R. Bowker Co., 3d ed., 1945); and Alfonso Gallo, *Patologia e terapia del libro* (Roma, Editrice Raggio, 1951 = *Enciclopedia poligrafica*, I.3).

The Pharmacy of S. Giovanni Evangelista

In some rosy future there will perhaps be for medical historians a Baedeker which will list and adequately describe, country by country and city by city, the medical monuments which they can visit in their travels. On such a list the pharmacy of S. Giovanni Evangelista, located just a step from Parma's great Duomo and Battistero, will have high place. Opened to the public in 1201, systematized in connection with the church and monastery of S. Giovanni Evangelista in the seventeenth century, and administered privately in the nineteenth century, it passed in the year 1896 to the possession of the Museo Nazionale of Parma. Its four rooms have now been lovingly restored and are deservedly an added source of pride to a city already rich in its artistic and historic patrimony.

Cases and shelves of carved walnut, lunettes carrying frescoes of Mercury, Apollo, Galen, Averroes, Hippocrates, Aesculapius, Aëtius, Dioscorides, Avicenna, and Mesue, and also of twelve outstanding Parmesan physicians of the sixteenth and seventeenth centuries, mortars, pestles, jars, jugs, scales —all speak of the centuries during which this pharmacy served the citizens of Parma. Not least in interest are the inscriptions, some twenty in number, which appear in lunettes, over doors, etc. Of these the two following can serve as worthy examples: HAC ITUR AD VENENA. CAVE TIMEAS; VEL IPSA AESCULAPIUS AD SANANDOS HOMINES COMPELLIT and HAC AD CELLAM VINARIAM DESCENSUS. CAVE NE INCERTUS ASCENDAS.

A brief description by Filippo Zanetti is contained in the pamphlet *La storica farmacia di S. Giovanni Evangelista* (A cura dell' Ente Provinciale per il Turismo, 1951). Historians will also want to visit at Imola the somewhat later pharmacy described by Nevio Matteini in *Romagna* (Bologna, Cappelli, 1954), pp. 250-252, and at Venice the one already mentioned in this journal (1955, *10*, 242). There would be many more worthy of description in our proposed Baedeker.

Robert Boyle and Samuel Collins on Russia

The attention of our readers is directed to Leo Loewenson's paper entitled "The Works of Robert Boyle and 'The Present State of Russia' by Samuel Collins (1671)" which appeared in *The Slavonic and East European Review* for June, 1955 (vol. 33, pp. 470-485). Boyle and Samuel Collins were both interested in Russia and the customs of its people. Boyle discusses

Russia in various writings, especially in his *New experiments and observations touching cold* (published in London in 1665), Samuel Collins in *The present state of Russia, in a letter to a friend at London; written by an eminent person residing in the great Tzar's court at Mosco for the space of nine years* (published at London in 1671). Two passages in Boyle's later work, *General History of the Air,* published posthumously in 1692, illustrate the nature of the information which Boyle obtained from Collins.

Doctor Collins relates, that in Muscovy their Horses are much subject to a very scurvy Disease, whose Russian Name I have forgot, from which the Natives are wont to preserve them, by keeping Goats in their Stables: And being ask'd by me, whether he had this by Tradition or upon his own Trial? He affirmed, that he had found it true himself, and that he therefore was wont to keep Goats in his own Stable. [p. 246]

The Russian Emperor's Physician confirmed to me, that at *Arch-angel* (where he was more than once) they averr'd to him, that in Winter-time a Northerly Wind (which comes from the Sea) produces a kind of Thaw, so as to make the Eves drop, though a North-East Wind rather confirms the Frost; but on the contrary, a Southerly Wind blows over a thousand or a hundred Mile of frozen Land, does rather increase the Frost than bring the Thaw. [p. 155]

An even more interesting passage occurs on the third and fourth pages in the introductory 'Publisher to the Reader' of the second edition of Boyle's *New Experiments and Observations Touching Cold* (1683):

But two persons there are above the rest, from whose Answers the Author drew the considerablest part of the following Appendix. One was an ingenious English Physician, dead many years since, that was Archiater to the then Russian Emperour; for whom our Author having furnish'd this Physician with some pleasing, and yet effectual, Chymical Medicines, that were very well lik'd, and nobly rewarded, by the Czar, the Author desir'd as his recompence, to have some Observations about Cold (whereof he sent a list) made in Russia, and especially at the City of Mosco, where the Physician, attending his Master, resided. The Answers to Mr. Boyle's Queries were by misfortune not sent by themselves, but in several Letters intermingled with so many other Passages, relating to the Russian Monarch's Government, Religion &c. that to put them in the Writer's own words (which was thought the fairest and surest way to prevent mistakes) some of them must be dismembred from the Context, and so must appear as torn and incoherent rags, and consequently to the great disadvantage of the Papers, they are made parts of.

J. F. F.

Versified History

The preface to Johann Ernst Hebenstreit's *De homine sano et aegroto carmen* (Leipzig, haeredes Lankisiani, 1753) provided fourteen pages of hexameter verse entitled "De antiqua medicina." A modern, shorter, and somewhat more humorous counterpart of this appeared in *Minerva Medica, 45* (no. 80, 6 ottobre 1954) and in a reprint of smaller format. The facile Italian verses, by Ugo Piazza, trace refreshingly the history of medicine in

ancient times, in the Middle Ages, in the Renaissance, and in modern times. The idea was Tomaso Oliaro's; the four cartoons which illustrate the four periods, and through which the reader is guided by the verses, are by G. Gheduzzi. The flavor cannot be reproduced in translation; suffice it to mention here that Röntgen's rays, by this account, proved such a miracle that now the patient trusts them more than his physician and demands them the moment he feels the least bit indisposed.

Science in the Renaissance: A Survey

Items of interest to medical historians often appear in nonmedical periodicals, and this department will be grateful for notices and/or reprints of them. For example, a helpful article by C. Doris Hellman bearing the title above was published in *Renaissance News* (1955, *8,* 186-200). Pages 196-200 in particular relate to medical history.

The DE ALCHIMIA *of Albertus Magnus*

Attention is directed to a paper by Professor F. A. Paneth on the text of Albertus Magnus' *De alchimia* published in the *Jahrbuch 1955 der Max-Planck-Gesellschaft zur Förderung der Wissenschaften e. V.* (pp. 141-159 and 8 plates) under the title "Über die echte Schrift Alberts des Grossen *De alchimia.*" Since the great fourteenth century Codex which formerly belonged to Professor Paneth is now in the Yale Medical Historical Library, his paper is of special importance to the authorities at Yale. But both it and the Codex will be of interest also to all those who concern themselves with the history of science.

J. F. F.

History of Children's Hospitals

An interesting note by Samuel X Radbill on "The history of children's hospitals" has appeared in the *A.M.A. Journal of Diseases of Children* for October, 1955 (vol. 90, pp. 411-416). With characteristic thoroughness, Dr. Radbill has traced the history of hospitals from ancient times, including those of the Irish druids who had established a "house of sorrow" as early as 300 B.C. He also gives special attention to the foundling hospitals of Paris in the seventeenth century and those of England in the eighteenth, winding up with the Children's Hospital in Philadelphia (1855) and that of Boston, founded in 1869.

J. F. F.

Origins of Electroshock Therapy

Kellaway[1] has pointed out that Scribonius Largus in his treatise on therapeutics, *De compositionibus medicamentorum,* about 48 A.D., writes of treating cases of severe headache by placing a live torpedo on the patient's

head, thus stimulating it to deliver its electric charge. This in large torpedoes amounted to 50 or 60 volts, sufficient certainly to cause stupefaction. Galen (Kühn, XII, 365) tells the same story, as does Pliny the Elder who also recommended (32. 10. 46. 133) torpedoes to assuage the pain of childbirth. Dr. Ernest Harms in a recent note in the *American Journal of Psychiatry*[2] draws attention to the fact that electroshock therapy was also used in the eighteenth century.

. . . One can trace such electrotherapy back to 1740 when, shortly after electricity had been experimentally isolated, its application for medical purposes started long before the idea matured that it would be such an important technical factor. Beginning in 1744, the *Histoire de l'Académie Royale des Sciences* of France brought out a report on "Electricity and Medicine" every second year. There are "guérisons" (cures) reported from all over Europe; from the Italian "miracle" priest Abbé Nollet,[3] from the Swiss Louis J. Jallabert, from the Dutchman Leyde, and from a number of others. Among the cures reported, a majority were neurological and mental cases of paralysis and epilepsy. In the report of 1755, pages 9 to 11, a Frenchman, Dr. J. B. LeRoy, reports in detail his cure of what today may be called a case of hysterical blindness. After the patient received his first "commotion" (shock), he reacted with convulsions of the eyes and he saw rays of light for the first time. When he received 3 shocks, the third somewhat stronger than the others, he screamed and fainted, and as a result of this treatment he began to regain his eyesight. There is no doubt that we are presented here with an actual electroshock treatment and probably the first one.

It is thus clear that when Cerletti[4] of Rome recently introduced electroshock therapy, he was merely reviving a fine old Roman custom which had been taken up again in the eighteenth century.

J. F. F.

Logan Clendening Lectures

Dr. Lloyd G. Stevenson, member of the Board of Editors of this journal and Associate Professor of the History of Medicine and Honorary Librarian of the Medical Library at McGill University, has been chosen to deliver the Seventh Series of the Logan Clendening Lectures on the History and Philosophy of Medicine. These will be given at the University of Kansas in Lawrence on 24 April 1956 and at the University of Kansas Medical Center in Kansas City the following day. The titles tentatively selected are "Poison, Infection and Contagion" and "The Story of Curare."

1 Kellaway, P. The part played by electric fish in the early history of bioelectricity and electrotherapy. The William Osler Medal Essay. *Bull. Hist. Med.*, 1946, *20*, 112-137.

2 1955, *111*, 933-934.

3 Although onetime professor at Turin, the Abbé Nollet was French.

4 Cerletti, U. Old and new information about electroshock. *Amer. J. Psychiat.*, 1950, *107*, 87-94.

D. J. Davis Lecture

The annual D. J. Davis Memorial Lecture on Medical History will be delivered at 1:00 p.m. on 9 May 1956 at the Medical-Dental-Pharmacy Building of the University of Illinois College of Medicine, Chicago. The lecturer is Dr. C. I. Reed, Professor in the Department of Physiology at the University of Illinois. He will speak on "John Morgan, Father of the First American Medical School."

Creation of First Chair and Department of the History of Medicine in India

The Andhra Government has recently sanctioned the appointment of a Professor of the History of Medicine and the organization of a Department of the History of Medicine in the Andhra Medical College, Vizagapatnam.

An Upgrading Committee was appointed by the Government of India, Ministry of Health, in 1948 to make recommendations regarding the improvement of certain branches of teaching and research in the existing medical colleges and institutions in India with a view to enlarging the existing facilities for research and postgraduate teaching of medical personnel. This committee made a number of recommendations in three priority groups. Since there was neither nucleus nor background for a department of the history of medicine in the Andhra Medical College, the Government decided to take steps to organize such a department, the first in India.

The new chair was offered to and has been accepted by Professor D. V. Subba Reddy, Head of the Department of Physiology, Madras Medical College, Madras, and founder-Secretary of the Indian Association of the History of Medicine. Professor Subba Reddy has been a pioneer in India in the promotion and popularization of studies in the history of medicine and is well known in international circles devoted to the study of medical history.

Book Reviews

MUNK'S ROLL, *Vol. IV. Lives of the Fellows of the Royal College of Physicians of London 1826-1925.* G. H. Brown, Comp. London, Published by the College, 1955. x, 637 pp. £2.2.-.

Reviewed by the EDITOR.

WILLIAM Munk, the original compiler of the three-volume *Roll of the Royal College of Physicians of London,* was a graduate of University College, London, who took his M.D. degree at Leiden in 1837. He became a Fellow of the College of Physicians in 1854, and served as its Harveian Librarian from 1857 to 1898. The first edition of the 'Roll,' which appeared in 1861, was made up of two volumes and contained 1351 sketches of Fellows and Licentiates who had been admitted between the foundation of the College in 1518 and the end of the eighteenth century. The third volume was published along with the second edition of the first two in 1878; in this additional volume 372 lives were added which carried the record up to 1825, the year in which the College moved from Warwick Lane to its present situation at Pall Mall East, opposite Trafalgar Square.

The volume under review is a most welcome addition to this indispensable biographical tool. It contains short accounts of the 874 Fellows (not Licentiates) elected between 1826 and 1925 and who died before 1 January 1954. The book was inspired by the present Harveian Librarian, Sir Edward Charles Dodds, and was compiled by Mr. G. H. Brown, M.A., B.Litt., with the assistance of Dr. J. J. Keevil, Former Keeper of the Library, and Mr. L. M. Payne, Assistant Librarian. In his preface Mr. Brown explains that the biographies had "been written to conform to a certain standard of detail and a rough—not a rigid—uniformity of presentation, the aim being to ensure that the same detail, when available, is provided in each biography, rather than that they should follow the same exact pattern. No attempt has been made to include complete bibliographies of Fellows' writings; their more important works are, however, named in the text, and some indication of the branches of medicine in which they were particularly interested is usually given." As source material he has used the medical directories and obituaries appearing in journals such as *Lancet* and the *British Medical Journal,* and he has also consulted the *Dictionary of National Biography* and Plarr's *Lives of the Fellows of the Royal College of Surgeons.*

The individual lives are brief and well written. As an example, one may cite his characterization of Sir Clifford Allbutt: "Allbutt's energy was matched only by his versatility. A scientific physician who made available contributions to almost every branch of medicine, he was also a profound scholar versed in the history, classical and modern, of his art; not least among his writings were *Greek Medicine in Rome and other Historical Essays*

(1921). A fluent and stylish writer himself, he deplored the slipshod English frequently to be found in scientific papers. His temperament was sanguine and equable, his bearing courtly and aristocratic. It is probable that George Eliot drew the character of Lydgate in *Middlemarch* from Allbutt whom she knew in his Yorkshire days. In his youth Allbutt had been a keen Alpine climber, and throughout his long and active life he preserved the best of health." One finds other familiar figures such as George Paget, Osler, Mott, Halliburton, Walter Morley Fletcher, George Riddoch, and Alexander Fleming, to mention only a few. The volume concludes (pp. 603-628) with a list of College Officers, Harveian Librarians (only nine between 1654 when Christopher Merrett was appointed and 1949 when the present Harveian Librarain took office), and the Lectures and Lecturers of the College, e.g., Lumleian, Goulstonian, Harveian, Croonian, etc. There is a good index (pp. 629-637) compiled by Miss O. M. Lloyd.

Medical librarians and collectors will be glad to know that the second edition of volumes I-III (1878) are still available and can be purchased together with the fourth volume at a price of four pounds.

Scritti inediti di Girolamo Fracastoro, con introduzione, commenti e note a cura di Francesco Pellegrini. (Publication of the Accademia di Agricoltura, Scienze e Lettere, Verona.) Verona, Edizioni Valdonega, 1955. xiii, 424 pp., illus. Lire 3200.

Reviewed by DOROTHY M. SCHULLIAN, *Curator of Rare Books, Armed Forces Medical Library, Cleveland, Ohio.*

FOR 25 October 1953, the editor of this volume had prepared an oration commemorative of the four hundredth anniversary of the death of Fracastoro. Scheduled for delivery before the Accademia di Agricoltura, Scienze e Lettere of Verona, it was read in his illness by Mons. Giuseppe Turrini, that dedicated librarian through whose vision and toil the Biblioteca Capitolare of Verona has risen phoenix-like from the bombings of World War II to become again a thing of beauty. At the same commemorative session the philologist Musitelli of Milano set forth in very clear terms the debt which Fracastoro owed to Vergil.

These events are now mirrored, as it were, in the volume under consideration. From manuscripts at the Biblioteca Capitolare and at the Biblioteca Vaticana Professor Pellegrini has edited, as Varius and Tucca did for Vergil, works which had not yet been given to the world upon their author's death. The difference is that Vergil's mighty epic, which from a desire for utter perfection he had ordered destroyed on his death, was already complete except for a few unfinished lines and inconsistencies; what Fracastoro left behind, a score of years after his *Syphilis* had been published, was a series of minor treatises and poems, many of them rather fragmentary and in varying stages of completion, and some in an exceedingly poor state of

preservation. Professor Pellegrini's task of editing here several not previously published has been Herculean, and he has acquitted himself well of it because of his unfailing regard for the best principles of text criticism and his painstaking devotion to the universal worth of his author.

The universality of Fracastoro's knowledge included not only medicine, but also other fields which were important to his day and remain so to ours —theology, in particular the controversy at Verona in 1538-40 as the influence of the reformers from the North became more marked, the problems of grace, predestination, and free judgment, and the interpretation of the Apocalypse of St. John; oratory, as represented in an address of welcome for the entry of Bishop Gian Matteo Giberti into Verona in 1528; cosmogony and astronomy; botany as typical of the natural sciences whose study was fostered with such fervor in that age. Prose pieces in all these fields are presented here with helpful introductions and exhaustive notes, and sometimes with more than one version of the text itself.

For medical historians, however, the most valuable section in the volume is the first, which introduces them to the working methods of Fracastoro and presents the background of the poem *Syphilis*. Four fragments of a letter relate how the manuscript was sent to Andrea Navagero, failed to reach him, and was instead reproduced without authorization in some fifty copies which circulated in Venice to the great indignation of both Navagero and the author. Fracastoro also discourses on a favorite subject of his, the bond between philosophy and poetry, and on his motives in writing the poem. This letter may have accompanied the manuscript of the poem when he sent it in 1525 to Pietro Bembo for suggestions. Bembo returned one hundred and eleven suggestions, whose publication here will be welcome to students of both authors. Comparison with the finished poem reveals that only eighteen were fully adopted by Fracastoro. They are all of immense interest and reveal clearly that toil and polishing as well as inspiration are necessary to poetry.

There are those who hold that a glance at the scaffolding of an author's masterpiece, an investigation into his working methods, an acquaintance with compositions of his which are not masterpieces, are elements which lessen his stature. Professor Pellegrini with this volume has rather, in the opinion of the reviewer, enhanced the masterpiece itself. Fracastoro will be better understood, his *Syphilis* more deeply appreciated, because of the texts presented here. The volume is beautifully published, with twelve fine plates, for the Accademia di Agricoltura, Scienze e Lettere of Verona, and it crowns such earlier publications of its editor on the same author as "L'inedito del dialogo Fracastorius, sive de anima" (1948); "Due lettere inedite di Fracastoro intorno alle cause dei giorni critici" (1949); *Origini e primi sviluppi della dottrina Fracastoriana del contagium vivum* (1950); *Vita di Girolamo Fracastoro con la versione di alcuni suoi canti* (1952); "Su taluni dei principali ricorsi storici della dottrina sui contagi" (1954); "Appunti per una

disposizione cronologica dei componimenti poetici del Fracastoro" (1954); and the commemorative address cited in the first paragraph of this review, "Girolamo Fracastoro" (1954).

LUIGI GALVANI. *Commentary on the Effect of Electricity on Muscular Motion.* Translated by Robert Montraville Green. Cambridge, Massachusetts, Elizabeth Licht, 1953. xx, 97 pp., illus. $4.00.

Reviewed by FREDERICK G. KILGOUR, *Librarian, Yale Medical Library.*

ONE hundred and sixty-two years elapsed following Galvani's publication of his *De viribus electricitatis in motu musculari commentarius* in 1791 before an English translation appeared. Then, in 1953, two publishers put out separate editions: the present volume and the Burndy Library edition which Charles D. O'Malley ably reviewed in the October 1954 issue of this *Journal.* It should be said immediately that the Burndy edition is superior in every respect.

There is, of course, no need to pass judgment on Galvani's great work. His Latin expository prose was, however, utterly miserable, and Dr. Green had great difficulty in making a translation, as the first sentence demonstrates: "In my desire to make that which, with no inconsiderable expenditure of pains, after many experiments, I have succeeded in discovering in nerves and muscles, so far useful that both their concealed properties might be revealed, if possible, and we might be able more surely to heal their diseases, nothing seemed more suitable for fulfilling such a wish than if I should simply publish my results, just as they are, for general judgment." Galvani, like some modern scientists, had trouble in introducing his subject, and Dr. Green didn't help him very much. It is perhaps unfair to quote this sentence because it is probably the least intelligible in the book. This type of translation has one dubious advantage in that it constantly reminds the reader by its infelicity of phrase that the original was not a product of the twentieth century.

J. C. T. OATES, Compiler. *A Catalogue of the Fifteenth-Century Printed Books in the University Library, Cambridge.* Cambridge University Press, 1954. xiii, 898 pp. $18.20.

Reviewed by the EDITOR.

WITHIN the last few years there have been published a number of important catalogues of fifteenth century books, one of the most notable being that of the Wellcome Medical Historical Library, edited by F. N. L. Poynter. The present catalogue of incunabula in the Cambridge University Library is indeed a remarkable document and it indicates that Cambridge possesses 4,250 separate items—probably the largest collection of fifteenth century books in any single library. Individual entries are listed by short title with

folding, i.e., whether quarto or folio, the size in millimetres and, when printed, the exact date of appearance is also indicated. There are valuable notes with details concerning provence, binding, etc., and over a hundred items are included which are not described in other catalogues of fifteenth century books. Such items are fully collated. The usefulness of the catalogue is greatly increased by its three indexes, one of printers, one of authors and anonymous titles, and the third of provenance in which more than three thousand names are registered. Cambridge University is to be congratulated on this distinguished catalogue, and Mr. Oates, the Under Librarian, has rendered an invaluable service in completing the catalogue originally planned in 1870 by Mr. Henry Bradshaw.

ERNEST JONES. *The Life and Work of Sigmund Freud.* Vol. 2, *Years of Maturity 1901-1919.* New York, Basic, Books, Inc., 1955. xiii, 512 pp. $6.75.

Reviewed by WINFRED OVERHOLSER, *Superintendent, Saint Elizabeths Hospital, Washington, D. C.*

DR. Jones has undertaken in this volume an even more gigantic task than in Volume 1 (see review in January 1955 issue of this *Journal,* p. 128). The "Years of Maturity," as he properly terms them, were marked by an extraordinary production of books, articles, and correspondence, by development of the theories of psychoanalysis, by the organization of the International Psychoanalytic Association, by the acquisition of many loyal followers, and by the defection of others. To organize such an overwhelming mass of material is no mean assignment, but Dr. Jones has accomplished it in a remarkable manner.

Part 1, Life, deals with the chronology of the activities of Freud, starting with the emergence from isolation, through the organization period, the opposition and discussions, and the war years.

Part 2, Work, considers the various writings of the period—expositions, contributions to technique, clinical contributions, case histories, the libido theory and other contributions to theory, and non-medical applications of psychoanalysis.

Part 3, The Man, deals with Freud's mode of life and work and his character and personality.

Dr. Jones presents in orderly fashion the development of Freud's ideas, together with the context of the times and circumstances which influenced it. He was a part of the circle; he knew Freud closely for over forty years, and also knew well the others of whom he writes. His account of the defections of Jung, Adler, and Stekel will undoubtedly be read with interest by adherents of Freud and of Jung and the others alike. Even here, where emotional involvement might easily warp judgments, Dr. Jones is well informed and apparently objective; although thoroughly devoted to Freud, he is no blind hero-worshipper.

Freud, say Dr. Jones, was sensitive to criticism—"it would be misleading to portray Freud as a model of Olympian calm" (p. 122). His mind, though mobile and plastic, worked thus only on condition that the ideas came from himself; he was very resistant to ideas which came from outside. Dr. Jones suggests that this was a defense against a basic credulousness (p. 429). It is this trait which is clearly the basis for the accusation leveled by the critical at Freud's supposed "obstinacy."

To summarize a book of this length in a review is impossible. The reader of the volume, whether he be an adherent or opponent of psychoanalysis or an interested observer, will enjoy the picture it presents of the intellectual development of one of the giants of our time—a man devoted to his family and friends, possessed of integrity, modesty, honesty of purpose, fearlessness, a capacity for creative speculation, and the simplicity of the truly great.

Dr. Jones has again put us in his debt.

FRANCELIA BUTLER. *Cancer through the Ages. The Evolution of Hope.* Fairfax, Virginia, Virginia Press, 1955. xiv, 147 pp., illus. $1.00.

Reviewed by the EDITOR.

THIS popular presentation of the history of the problem of malignancy carries a foreword by Joseph C. Aub, Director of Medical Laboratories, Collis P. Huntington Memorial Hospital of Harvard University, and an introduction by Stanley P. Reimann, Scientific Director, Institute for Cancer Research in Philadelphia. Although intended primarily to interest the public in supporting cancer research, this booklet contains useful historical material, including a very readable chapter on the history of smoking, and an informative chapter on cancer in colonial days.

JOSÉ JOAQUIN IZQUIERDO. *Montaña y los Origenes del Movimiento Social y Cientifico de México.* Mexico, D. F., Ediciones Ciencia, 1955. xvi, 442 pp., illus.

Reviewed by FRANCISCO ALONSO DE FLORIDA, *Research Assistant in Physiology, Yale University School of Medicine, New Haven, Connecticut.*

PROFESSOR Izquierdo projects the personality of Montaña—an outstanding man of the New Spain—into the social, political, and cultural world of the second half of the eighteenth century. At that time, many European colonies were striving not only for economic and political freedom, but intellectual independence as well.

Mexico is particularly interesting in this respect. Spain gave to the New World the Aristotelian concept of man and society; the state, with its institutions, is the positive social good, rather than a lesser evil, as it is in the Lockean societies. By this principle of authority, the universities influenced

the growth of ideas in the New Spain. Later, however, the principle of authority deteriorated and became confused with absolutism, particularly with the coming of the Bourbons.

The educational and medical institutions of New Spain—universities, colleges, schools, asylums, convalescent and mental hospitals—were as good as any in Europe as early as the sixteenth century. Later, as a consequence of absolutism, the world of ideas became static, and medicine and the sciences did not keep pace with the intellectual revolution in Europe.

The Spaniards born in America (*criollos*) reacted strongly against the so-called "Europeos" (i.e., Spaniards born in Spain) who, in addition to holding the power, adhered to a rigid scholasticism. Montaña, a "criollo," played the rôle of progressive physician, liberal teacher, and good patriot.

As a student of Hippocrates, he sought a different kind of medicine, based on observation rather than speculation; he introduced hospital teaching, and in 1805 tried, unsuccessfully, to introduce teaching at the patient's bedside. Montaña's acquaintance with modern science through reading and translating important works led him to maintain that interpretation of observational data should be based on physical and chemical knowledge.

Efforts were made to catch up with European science, but even more fascinating was the attempt at integration with Indian culture. Montaña, in particular, provided important observations concerning an epidemic known as Matlatltzahuatl among the Indians. He was also interested in botany, and made some observations on the curative properties of Mexican plants.

Contacts with physicians of the new republic of the United States were made regarding Montaña's observations on Matlatltzahuatl, or Spotted Fever as it was called by Mitchell.

The book is well documented with quotations, footnotes, and an extensive bibliography, which makes it valuable to the historian, although the book as a whole may make heavy reading for the layman. The volume is illustrated by plates and drawings. It contains a subject index, and Professor H. E. Sigerist has written an interesting preface in English.

The book, dedicated to the celebration of the fourth centenary of the National University of Mexico, the Old Royal and Pontificial University of the New Spain, is surely, as Professor Sigerist writes in his preface, "a beautiful book which is not only an important contribution to the history of medicine but to the cultural history of America at large."

DOUGLAS GUTHRIE. *Nursing through the Ages.* Reprinted from *Nursing Mirror* (England).

Reviewed by ELIZABETH S. BIXLER, *Dean, Yale University School of Nursing.*

DR. Douglas Guthrie, well known medical historian and lecturer on the History of Medicine at Edinburgh University, has given us in a series of

articles in the *Nursing Mirror* a brief but scholarly glimpse of the early history of nursing. Making it clear that Florence Nightingale's is not the only, nor even the first, name of importance in nursing, he reports from his search of the earliest known records a reference to nurses and nursing in the writings of Susruta, who lived in India in the fifth century B.C. Moving on through the ages the author points out the influence of the Crusades on the progress of medicine and nursing. Of the several orders, both religious and secular, established during this period for the care of the sick and needy at least one—the Beguines (founded in 1150)—is still active today, in Belgium and Holland.

To those who strive to answer the criticism "Nurses aren't what they used to be" it is comforting to read that three hundred years ago "one sister of 38 years' service said that 'the novices of today are quite unendurable . . . they do not go near the wards until the old sisters have finished the hardest part of the work.' " Dr. Guthrie reminds us that when the religious orders were suppressed in England there was no one to take the place of the sisters in caring for the sick, except the Sairy Gamps immortalized by Dickens. Thus, by the middle of the nineteenth century the time was ripe for a new crusader, in the person of Miss Nightingale, who believed that nursing could be a profession for the lay person as well as a calling for members of the religious orders.

The author does not include one "forerunner of psychiatric nursing" who might be mentioned—Joan-Baptiste Pussin, described by Semelaigne in his *Philippe Pinel et Son Oeuvre au Point de Vue de la Médecine Mentale,* 1888, as an untrained but dedicated man who, working with the mentally ill patients at the Bicêtre in Paris had started to "loosen the chains" even before Pinel was appointed to the position in which he carried out his famous reformation of the psychiatric hospitals. As a devoted disciple of Pinel, Pussin accompanied him to the Salpêtrière and continued to work with him for many years.

Other readers no doubt will champion still other early nursing figures who might have been included. Yet I am sure that seldom in such compact form has a greater amount of historical information been encompassed. This fact, coupled with the authenticity of the research involved, and the profuse illustrations, is certain to make this series of three articles very valuable to instructors and students in the history of nursing.

DOUGLAS GUTHRIE. *From Witchcraft to Antisepsis: A Study in Antithesis.* Logan Clendening Lectures on the History and Philosophy of Medicine, Fifth Series. Lawrence, University of Kansas Press, 1955. 53 pp. $1.50.

Reviewed by GEORGE BLUMER, *Professor of Medicine Emeritus, Yale University School of Medicine.*

THIS little book of fifty-odd pages, plus references and index, contains two essays, one on witches and witch-doctors, the other on Joseph Lister, the

father of modern sugery, and his achievement. As the distinguished author points out in his preface, the two subjects, as the title of the book indicates, appear to be antagonistic and yet each represents the origin and growth of an idea. Witchcraft and belief in witches originated in prehistoric times and still exists among some primitive peoples. The written records go back to the Babylonians, and even as late as the eighteenth century there were some medical men who believed in them. The account of their ups and downs, interestingly presented in the first essay, shows that medical ideas have always gone in cycles, as they still do, and that even well-trained physicians may be sufficiently credulous or unthinking to accept mystical explanations of some medical phenomena.

The account of Joseph Lister's discovery of the principles underlying modern surgery, suggested to him by the work of Pasteur on fermentation and the resulting disproval of the concept of spontaneous generation as its cause, are clearly outlined. Here, too, we are dealing with the development of an idea, and Dr. Guthrie plainly shows that as a result of his experience Lister gradually modified and perfected the techniques of surgery until, as he had predicted, it became quite a different affair than it was in the days when laudable pus, erysipelas, hospital gangrene, and other forms of sepsis were rife in the wards of even the best of hospitals. Lister's experience also demonstrated that in medicine no new idea gains a foothold without opposition, and in this case, curiously enough, opposition continued longest in London. For this reason Lister accepted a teaching position in that city more effectively to demonstrate his principle. As a medical student near the end of the nineteenth century the writer actually saw a few surgeons who had not accepted the Listerian doctrine and were still operating in soiled clothing. It would be difficult now, when every cavity of the body can be safely explored, to find a competent physician who would deny that Joseph Lister was the greatest benefactor of humanity that medicine has yet produced.

MIRKO DRAZEN GRMEK. *Hrvatska Medicinska Bibliografija.* Opis tiskanih knjiga i clanaka s podrucja humane i veterinarske medicine i farmacije, koji se odnose na Hrvatsku. Dio I: knjige Svl: 1470-1875. Zagreb, Izdavacki Zavod Jugoslavenske Akademije, 1955. 230 pp., 32 plates. (Croatian Medical Bibliography. Description of printed books and articles from the area of human and veterinary medicine and pharmacy, which bear upon Croatia. Vol. I. Part I: 1470-1875. Zagreb, Published by the editorial offices of the Yugoslav Academy, 1955. 230 pp., 32 plates.)

Reviewed by LJUBODRAG T. MIHAILOVIC, *Smith, Kline and French Research Fellow, Yale University School of Medicine.*

THE volume represents the first in the series *Hrvatska Medicinska Bibliografija* devoted to assembling all published medical, veterinary, and pharma-

ceutical writings bearing upon Croatia from the invention of printing until the present day. It contains books published during the four centuries following 1470—from Vergerie's incunabula on the education of youth and Wonnecker's *Hortus sanitatis* (the oldest printed medical work in which Croatia is mentioned) until the year 1875, which marks the beginning of modern medical writings in Croatia.

Since the volume deals with the oldest Croatian medical, veterinary, and pharmaceutical publications, the author felt it necessary to complete it by inclusion of certain borderline disciplines. Consequently it contains not only scientific writings from the above mentioned fields but also popular medico-educational works, descriptions of conditions of health, public medicine, health institutions, curative herbs and waters, considerations of animal husbandry, descriptions of certain epidemics, surveys of the organization of health services, biographies of distinguished physicians from a given period, etc.

Materia bibliographica, which consists of more than a thousand references, is arranged in alphabetical order by authors, the works of each being arranged chronologically. In such an extensive bibliographical undertaking there is the danger of compiling a catalogue instead of a bibliography. Valuable comments and notes supplied by the author, exceeding the frame of conventional and formal bibliographical descriptions, make the present volume an adequate mirror of the development of Croatian medical literature in this period. Besides the pertinent notes about the authors and short descriptions of the contents, the reader will find numerous critical comments on the works, secondary sources of the literature dealing with them, as well as information concerning the libraries where they are kept.

A carefully compiled subject index compensates for the disadvantages of the arrangement according to author. It gives an impression of the rich variety and the large scope of interest of these ancient writers on Croatian medicine, and provides an easy insight into the development of particular branches of medical literature.

Most of the works considered are dissertations written in Latin. The original scientific Croatian literature being rather modest until the second half of the nineteenth century, the books of early Croatian physicians seldom contain original contributions of importance for general progress and development of medicine. Valuable in this respect, however, is Mihailo Soretic's *Dissertatio inauguralis de sensibus externis eorumque se commezcio* (1765) in which Müller's law of specific nerve energies is partly anticipated. Interesting also are numerous books on certain epidemic and endemic diseases, particularly the literature on an unusual and rare endemic skin disease (a sort of inherited and specific hyperceratosis of extremities) discovered in the beginning of the nineteenth century on the Dalmatian island Mljet, to the identification of which, as a specific nosological unit

known as "Mal di Meleda," Croatian physicians contributed a great deal.

Of particular value is the author's foreword which, as well as its shorter, lucidly written Latin version, represents a concise survey of historical and social conditions underlying the development of Croatian medical literature. It serves as an excellent introduction to the rich collection of bibliographical references.

As a reflection of growing historical consciousness, and of the tendency to turn toward national sources of medical literary inheritance (to which the author himself contributed numerous historical essays), the book will be welcomed not only by professional historians of medicine but by all those who have learned to seek in the past the inspiration for further achievements.

We hope that the book will accomplish another important purpose—to bring the Yugoslav medical literature, older and richer than is commonly thought, to the attention of readers outside that country.

MACDONALD CRITCHLEY. With the collaboration of William H. McMenemey, Francis M. R. Walshe, and J. Godwin Greenfield. *James Parkinson (1755-1824). A Bicentenary Volume of Papers dealing with Parkinson's Disease, Incorporating the Original 'Essay on the Shaking Palsy.'* London and New York, Macmillan and Co., Ltd., 1955. xvi, 269 pp. 15s.

Reviewed by the EDITOR.

THIS book about a little-known neurologist is divided into five parts, as explained in the introduction by Macdonald Critchley, neurologist to Queen Square. The biographical essay by William H. McMenemey is particularly welcome as it gives details about his life that have not hitherto been available. Apart from the brief notice in the *Dictionary of National Biography*, there had previously been no full-length account of Parkinson. Dr. McMenemey includes in addition to a bibliography of references to Parkinson in general medical literature a list of Parkinson's own writings and of anonymous pieces attributed to his pen. The list is useful but one could have wished that the pagination of Parkinson's principal writings and the extent of his journal contributions had been included.

The third section includes a reprinting of the full text of Parkinson's "An Essay on the Shaking Palsy." J. G. Greenfield's commentary on the pathology of Parkinson's disease constitutes the fourth chapter, and there follows a final analysis by Sir Francis Walshe entitled, "A clinical analysis of the paralysis agitans syndrome."

There are four plates: the first facing page 234 shows cell inclusions from the forebrain substance in a case of Parkinsonism, the second gives a series of myographic records of voluntary flexion-extension of the right elbow which do not really illustrate the text; the third plate shows electromyo-

graphic records of voluntary index flexor contraction which, along with plate four, do illustrate the text rather better.

Ceremonies marking Parkinson's bicentenary had been held at St. Leonard's Church in Shoreditch (where Parkinson was born) in the autumn of 1955 and those who have contributed to this volume participated in the observance.

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